INJURY EXPERIENCE IN THE QUARRYING INDUSTRY, 1954

ANALYSIS OF SAFETY FACTORS AND RELATED EMPLOYMENT DATA

BY JOHN C. MACHISAK AND NAOMI W. KEARNEY

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INJURY EXPERIENCE IN THE QUARRYING INDUSTRY, 1954

ANALYSIS OF SAFETY FACTORS AND RELATED EMPLOYMENT DATA[1]

By

John C. Machisak[2] and Naomi W. Kearney[3]

Introduction and Summary

THE INJURY data and experience at quarries and related plants of the United States are presented in this publication under the following general sections:

(A) *General injury experience:*

Tables 1 through 3: Contain current data on the number of injuries, injury-frequency rates, location, accident agency, degree of injury, and related employment data.

(B) *Injury experience at different kinds of quarries:*

Tables 4 and 5: Contain current data on number of injuries, injury-frequency rates, location, accident agency, degree of injury, and related employment data.

(C) *Injury experience by States:*

Tables 6 through 19: Contain current data on the number of injuries, injury-frequency rates, accident agency, degree of injury, and related employment data.

(D) *Selected injury data:*

Tables 20 through 29: Contain current data on various selected factors of operating conditions at different kinds of quarries, including size by employment groups, length of shifts, comparative severity of injuries, and injury data on related employment experience at dimension-stone and non-dimension-stone quarries and at underground quarries.

(E) *Historical injury experience:*

Table 30: Contains injury and employment data on the quarrying industry for 1911 through 1954.

Beginning in 1911 the Bureau of Mines collected reports directly from the operators of stone quarries. From that time reports have been collected annually, and they represent all phases of the quarrying industry except sand, gravel, and clay. The tables in this circular are compiled from these reports since the Bureau of Mines is authorized to collect data from the operating companies on injuries and employment, but there is no Federal law that

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compels the operators to supply such data; therefore, the reports received from operators are voluntary responses to the Bureau's requests for information. The figures presented may not be complete for the entire industry, but every effort has been exerted to make them so, and they are believed to be representative of the hazards to which quarry workers are exposed.

Between States the figures are comparable—an extremely significant fact in view of the lack of uniformity among the States, with regard to the classes of injuries covered by State reports, and other factors that tend to make it impracticable or impossible to compare the accident experience of one State with that of another or to understand the relative importance of the various causes of accidents in the industry as a whole.

The stone quarries covered in this circular are classed according to the kind of rock produced—cement rock (including limestone or other stone used in making cement), limestone, marble, sandstone, slate, traprock, and granite. The other phases of the quarrying industry cover crushing, screening, rock dressing, and the manufacture of cement and lime.

This report is the 35th publication containing statistical data on injuries and employment at quarries and related industries in the United States. All previous reports were issued as Bureau of Mines bulletins. The last similar publication was Bulletin 566, Injury Experience in the Quarry Industry, 1953. Commencing with this report, these data will be presented in the Information Circular series.

ACKNOWLEDGMENTS

The Bureau of Mines gratefully acknowledges the cooperation of quarry operators throughout the Nation, whose voluntary response to the Bureau's survey requesting information on the injuries and related employment data form the basis of the tables contained in this publication.

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GENERAL INJURY EXPERIENCE

Reports from operators of stone quarries and related plants in the United States during 1954 show a favorable decline in the number of fatal and nonfatal injuries. The combined injury-frequency rate of 22.00 was 7 percent lower than the corresponding rate of 23.68 per million man-hours of worktime for the previous year. The fatality rate (0.19) and the nonfatal-injury rate (21.81) were the lowest ever recorded as shown in table 30.

A very slight decrease in the number of active quarries, accompanied by a larger decline in the average number of men employed daily and the man-hours of work performed, is reflected in the decrease in the number of injuries received. In 1953, 43 fatal injuries were reported, while, in 1954, 34 men were killed. According to reports for 1953 there were 4,450 nonfatal injuries, and for 1954 there were 3,834 nonfatal disabling injuries.

Reports were received for 2,252 active quarries and processing plants. A working force of 78,910 men averaged 273 days of work per man, and the total man-hours worked was 175,817,150. Of the 3,868 disabling injuries reported to the Bureau, 34 resulted in death, 7 were permanent total injuries, 136 were permanent partial injuries, and 3,691 were temporary total injuries lasting longer than the remainder of the day on which the injuries occurred.

Operators are not requested to submit data showing the duration of disability resulting from an injury, therefore, the number of days lost in proportion to the number of man-hours worked (severity rate) cannot be given. However, an estimate can be made of the injury-severity rate from information obtained from records of the plants that participated in the National Safety Competition, a yearly safety contest conducted by the Bureau of Mines. The severity or time-loss rate for 1954 is estimated as 1.90 days per thousand man-hours of exposure to hazard, compared with 2.83 days for 1953, a reduction of 33 percent. This estimate is obtained by assigning 6,000 days lost to each fatality and each permanent total disability, 738 days to each permanent partial disability, and 35 days to each temporary total disability reported to the Bureau of Mines by the operating companies. The total estimated days of disability for all injuries (fatal and nonfatal) in 1954 was 475,553. The duration of permanent partial and temporary total disabilities is the calculated averages for quarries during a 5-year period as revealed by records of the National Safety Competition.

Ninety-nine percent of the employees working in the quarrying industry in 1954 were at quarries and associated plants that had no fatal injuries. Of the 2,252 active plants and quarries, 18 had 1 or more fatal work injuries. The quarries and plants that reported fatal injuries had an average of 34 men working, and plants that had no fatal injuries employed an average of 35 men. The fatal injury-frequency rate for the 18 operations that reported the fatalities was 26.40 per million man-hours of employment. The fatality rate for the entire industry was 0.19. Plants that operated without a fatal accident reported 3,771 nonfatal disabling injuries with an injury-frequency rate of 21.61. Plants that reported fatal injuries had 63 nonfatal injuries, with an injury-frequency rate of 48.91 per million man-hours of worktime.

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GENERAL INJURY DATA

TABLE 1.—*Salient statistics on injuries, injury rates, and employment in the quarrying industry of the United States, 1950–54*

	1950	1951	1952	1953	1954
Number of injuries:					
Fatal	54	57	74	43	34
Nonfatal:					
Permanent total	7	6	3	8	7
Permanent partial	165	163	149	139	136
Temporary total	4, 590	4, 776	4, 351	4, 303	3, 691
Total nonfatal	4, 762	4, 945	4, 503	4, 450	3, 834
Grand total	4, 816	5, 002	4, 577	4, 493	3, 868
Injury-frequency rates per million man-hours:					
Fatal	0. 28	0. 30	0. 40	0. 23	0. 19
Nonfatal	25. 12	25. 87	24. 14	23. 45	21. 81
Total	25. 40	26. 17	24. 54	23. 68	22. 00
Number of active quarries	2, 455	2, 227	2, 240	2, 291	2, 252
Number of men working daily	85, 730	84, 802	81, 879	83, 641	78, 910
Average number of days active	272	277	279	278	273
Man-days worked	23, 346, 483	23, 469, 692	22, 843, 676	23, 248, 371	21, 505, 759
Man-hours worked	189, 534, 811	191, 113, 194	186, 551, 830	189, 776, 589	175, 817, 150
Average number of hours per man-day	8. 12	8. 14	8. 17	8. 16	8. 18
Average number of hours per man-year	2, 211	2, 254	2, 278	2, 269	2, 228

TABLE 2.—*Injury and employment data on all stone operations with and without fatalities, 1954*

	Plants without fatalities	Plants with fatal injuries	All plants
Number of plants	2, 234	18	2, 252
Average number of men	78, 290	620	78, 910
Proportion of total men (percent)	99. 2	0. 8	100. 0
Number of men per plant	35	34	35
Man-days worked	21, 342, 189	163, 570	21, 505, 759
Average days active	273	264	273
Man-hours worked	174, 529, 111	1, 288, 039	175, 817, 150
Average hours per man per year	2, 229	2, 077	2, 228
Number of fatal injuries		34	34
Number of nonfatal injuries	3, 771	63	3, 834
Fatal rate per million man-hours		26. 40	0. 19
Nonfatal rate per million man-hours	21. 61	48. 91	21. 81

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TABLE 3.—*Number and percentage distribution of injuries at all stone quarries and mines in the United States by agency, location, and degree of injury, 1954*

Agency and location	Fatal	Nonfatal					Percent of—	
		Permanent total [1]	Permanent partial [2]	Temporary total [3]	Total nonfatal	Number	Grand total	Group total
OPEN QUARRY								
Quarry:								
Falls or slides of rock or overburden	3	1	5	97	103	106	2.74	5.96
Handling materials:								
Handling rock at face	1		1	228	229	230	5.95	12.94
Handling other materials			1	97	98	98	2.53	5.51
Handtools			1	110	111	111	2.87	6.24
Explosives:								
Transportation				2	2	2	.05	.11
Charging				2	2	2	.05	.11
Drilling into old holes				6	6	6	.16	.34
Striking in loose rock				2	2	2	.05	.11
Thawing								
Caps, detonators, etc				2	2	2	.05	.11
Unguarded shots				1	1	1	.03	.06
Returned too soon								
Premature shots	2			2	2	4	.10	.22
Delayed blasts								
Miscellaneous				11	11	11	.28	.62
Haulage:								
Hand and animal				2	2	2	.05	.11
Quarry cars and motors				32	32	32	.83	1.80
Quarry trucks, tractors, etc	3	1	3	115	119	122	3.15	6.86
Railway cars and locomotives				9	9	9	.23	.51
Falls of persons:								
Falling into quarry from surface, benches, or face	1		3	28	31	32	.83	1.80
Falling from hoists, derricks, ladders, etc				32	32	32	.83	1.80
Miscellaneous	2		5	144	149	151	3.90	8.49
Falling objects (other than 1 and 2)	2		1	56	57	59	1.53	3.32
Flying objects:								
From sledging		1	3	42	46	46	1.19	2.59
Others	1	1	1	92	94	95	2.46	5.34
Electricity:								
Direct contact with trolley wire				2	2	2	.05	.11
Bar or tool striking trolley wire								
Contact with motor				2	2	2	.05	.11
Others				5	5	5	.13	.28
Drilling and channeling (by machine or hand)			2	126	128	128	3.31	7.20
Machinery:								
Hoisting cables and attachments			4	21	25	25	.65	1.41
Guys, cranes, derricks, and attachments	1		3	20	23	24	.62	1.35
Pumps and hoisting engines				2	2	2	.05	.11
Power shovels			5	46	51	51	1.32	2.87
Other machinery			4	82	86	86	2.22	4.84
Stepping on nail or sharp object				41	41	41	1.06	2.31
Boiler and air-tank explosions	4			1	1	5	.13	.28
Burns from flames and hot or caustic materials				25	25	25	.65	1.41
Other causes			2	225	227	227	5.87	12.77
Total in quarry	20	4	44	1,710	1,758	1,778	45.97	100.00
Surface:								
Quarry or mine cars and motors				27	27	27	.70	4.58
Railway cars and locomotives	1		1	32	33	34	.88	5.76
Run or fall of stone in or from bins	1		2	31	33	34	.88	5.76
Falls of persons			1	76	77	77	1.99	13.05
Stepping on nail or sharp object				16	16	16	.41	2.71
Handtools			4	54	58	58	1.50	9.83

See footnotes at end of table.

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TABLE 3.—*Number and percentage distribution of injuries at all stone quarries and mines in the United States by agency, location, and degree of injury, 1954*—Continued

Agency and location	Fatal	Nonfatal					Percent of—	
		Permanent total [1]	Permanent partial [2]	Temporary total [3]	Total nonfatal	Number	Grand total	Group total
OPEN QUARRY—continued								
Surface—Continued								
Electricity	------	-------	2	1	3	3	0.08	0.51
Machinery	------	-------	7	90	97	97	2.51	16.44
Handling materials	------	-------	3	111	114	114	2.95	19.32
Other causes	1	-------	2	127	129	130	3.36	22.03
Total surface at quarry	3	-------	22	565	587	590	15.25	100.00
Total open quarry	23	4	66	2,275	2,345	2,368	61.22	------
UNDERGROUND MINE								
Underground:								
Fall of rock from roof or wall	1	-------	-------	15	15	16	.41	10.26
Handling rock while loading at working face or chute	------	-------	-------	14	14	14	.36	8.97
Handtools	1	-------	1	18	19	20	.52	12.82
Explosives	------	-------	-------	5	5	5	.13	3.21
Haulage	------	-------	1	9	10	10	.26	6.41
Falling down chute, winze, raise, or stope	------	-------	1	7	8	8	.21	5.13
Run of rock from chute or pocket	------	-------	-------	1	1	1	.03	.64
Drilling	------	-------	2	34	36	36	.93	23.08
Electricity	------	-------	-------	-------	-------	-------	-------	-------
Machinery (other than locomotives or drills)	------	-------	1	9	10	10	.26	6.41
Mine fires	------	-------	-------	-------	-------	-------	-------	-------
Suffocation from natural gases	------	-------	-------	-------	-------	-------	-------	-------
Inrush of water	------	-------	-------	-------	-------	-------	-------	-------
Stepping on nail or sharp object	------	-------	-------	2	2	2	.05	1.28
Handling materials (other than rock)	------	-------	-------	11	11	11	.28	7.05
Other causes	------	-------	-------	23	23	23	.59	14.74
Total underground	2	-------	6	148	154	156	4.03	100.00
Shaft and slope:								
Falling down shaft or slope	------	-------	-------	-------	-------	-------	-------	-------
Objects falling down shaft or slope	------	-------	-------	2	2	2	.05	100.00
Breaking of cables	------	-------	-------	-------	-------	-------	-------	-------
Overwinding	------	-------	-------	-------	-------	-------	-------	-------
Cage, skip, or bucket	------	-------	-------	-------	-------	-------	-------	-------
Other causes	------	-------	-------	-------	-------	-------	-------	-------
Total shaft and slope	------	-------	-------	2	2	2	.05	100.00
Surface:								
Quarry or mine cars and motors	------	-------	-------	-------	-------	-------	-------	-------
Railway cars and locomotives	------	-------	-------	1	1	1	.03	5.26
Run or fall of stone in or from bins	------	-------	-------	-------	-------	-------	-------	-------
Falls of persons	------	-------	-------	2	2	2	.05	10.53
Stepping on nail or sharp object	------	-------	-------	-------	-------	-------	-------	-------
Handtools	------	-------	-------	2	2	2	.05	10.53
Electricity	------	-------	-------	1	1	1	.03	5.26
Machinery	------	-------	-------	1	1	1	.03	5.26
Handling materials	------	-------	-------	4	4	4	.10	21.05
Other causes	------	-------	-------	8	8	8	.21	42.11
Total surface underground mine	------	-------	-------	19	19	19	.49	100.00
Total underground mine	2	-------	6	169	175	177	4.58	------

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TABLE 3.—*Number and percentage distribution of injuries at all stone quarries and mines in the United States by agency, location, and degree of injury, 1954*—Continued

Agency and location	Fatal	Nonfatal					Percent of—	
		Permanent total [1]	Permanent partial [2]	Temporary total [3]	Total nonfatal	Number	Grand total	Group total
PROCESSING WORKS								
Crusher and mill:								
Haulage:								
Hand and animal	------	------	------	6	6	6	0.16	0.57
Quarry or mine cars and motors	------	------	1	9	10	10	.26	.95
Quarry trucks, tractors, etc	1	------	1	31	32	33	.85	3.12
Railway cars and locomotives	------	------	1	15	16	16	.41	1.51
Machinery:								
Hoisting cables and attachments	------	------	6	11	17	17	.44	1.61
Guys, cranes, derricks, and attachments	------	1	1	14	16	16	.41	1.51
Pumps and hoisting engines	------	------	------	1	1	1	.03	.09
Crushers	1	------	11	55	66	67	1.73	6.34
Other machinery	1	------	8	73	81	82	2.12	7.76
Handtools	1	------	2	71	73	74	1.91	7.00
Stepping on nail	------	------	------	13	13	13	.34	1.23
Electricity:								
Direct contact with trolley wire	------	------	------	------	------	------	------	------
Bar or tool striking trolley wire	------	------	------	------	------	------	------	------
Contact with motor	------	------	------	1	1	1	.03	.09
Others	------	------	------	4	4	4	.10	.38
Falls of persons	1	------	5	139	144	145	3.75	13.72
Falling objects	------	------	3	75	78	78	2.02	7.38
Flying objects:								
From sledging	------	------	1	17	18	18	.47	1.70
From crushing	------	------	1	13	14	14	.36	1.32
Others	------	------	------	35	35	35	.90	3.31
Handling materials:								
Handling rock by hand	------	------	------	58	58	58	1.50	5.49
Handling other materials	------	------	3	124	127	127	3.28	12.02
Burns	------	------	2	55	57	57	1.47	5.39
Other causes	------	1	2	182	185	185	4.78	17.50
Total crusher and mill	5	2	48	1,002	1,052	1,057	27.33	100.00
Auxiliary works:								
Quarry or mine cars and motors	------	------	------	1	1	1	.03	.38
Railway cars and locomotives	1	------	1	5	6	7	.18	2.63
Falls of persons	2	1	------	42	43	45	1.16	16.92
Falling objects (rocks, timbers, etc.)	1	------	------	32	32	33	.85	12.41
Stepping on nail or sharp object	------	------	------	2	2	2	.05	.75
Handtools	------	------	------	17	17	17	.44	6.39
Electricity	------	------	2	7	9	9	.23	3.38
Machinery	------	------	8	20	28	28	.72	10.53
Handling materials	------	------	1	59	60	60	1.55	22.55
Other causes	------	------	4	60	64	64	1.65	24.06
Total auxiliary works	4	1	16	245	262	266	6.88	100.00
Total processing works	9	3	64	1,247	1,314	1,323	34.20	100.00
Grand total	34	7	136	3,691	3,834	3,868	100.00	------

[1] Permanent total disability: The loss of, or loss of use of, both hands, or both arms, or both legs, or both feet, or both eyes, or any 2 thereof; or any injury (except death) that permanently and totally incapacitates the injured person from following any gainful occupation.

[2] Permanent partial disability: Loss of, or loss of use of, 1 foot, leg, hand, arm, or eye; or loss of part of bone of 1 of the foregoing; or loss, or loss of use of 1 or more fingers, or 1 great toe, or any 2 or more toes; or the permanent impairment of use of any part of the body.

[3] Disability for more than remainder of day of accident.

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INJURY EXPERIENCE AT DIFFERENT KINDS OF QUARRIES

Cement Rock

The cement industry, including quarries and the related plants, was again outstanding among the major industries of the Nation in safeguarding its employees from the hazards to which workmen are exposed. The survey conducted by the Bureau of Mines shows 175 active cement quarries, including a small number of mills or other plants not directly operated in connection with quarries.

Employment was slightly reduced in 1954, both in the average number of men employed and in the number of man-hours of employment. The average employee worked 320 days or 2,564 hours on an average of 8.00 hours per day.

There were 6 fatal injuries reported, 10 less than the previous year, and 322 nonfatal injuries, 66 less than in 1953. Of the 6 deaths, 1 man was killed in an underground quarry by a fall of rock from the roof and 5 were killed outside the quarries—3 by falls of persons, 1 by haulage, and 1 by a falling object. The main causes of the nonfatal injuries were falls of persons, machinery, handling materials, and haulage. The overall injury-frequency rate (fatal and nonfatal) for the cement quarries and mills in 1954 was 4.61, or 14 percent below the corresponding injury rate of 5.33 reported in 1953.

Granite

The overall injury experience at the 203 granite quarries and related plants was more favorable in 1954, particularly in the nonfatal group, although the number of fatalities was double that reported in the previous year. However, the overall injury-frequency rate dropped from 41.02 in 1953 to 35.41 in 1954. Of the 4 fatal injuries reported, all occurring in the open quarry, 1 each was by falls of rock, haulage, fall of persons, and flying objects. Of the 457 nonfatal injuries, the greatest number happened from handling materials, falls of persons, machinery, and flying objects. Fewer men were employed during 1954, and they worked 9 days less than the previous year, with a 4-percent decrease in the number of man-hours of work performed by the average employee.

Limestone

Injury experience in the 1,302 limestone rock quarries and related plants improved in 1954 in both the fatal and the nonfatal groups, with a drop of 8 percent in the overall injury-frequency rate, from 36.81 in 1953 to 33.70 in 1954. Of the 12 fatal injuries reported, 5 occurred in the open quarry—2 from falls of persons, 1 while handling materials, 1 by haulage, and 1 by a falling object; 3 men were injured fatally at the surface works—1 each by haulage, run or fall of stone, and an undetermined cause; 1 death was from a handtool injury in the underground quarry; and 3 were killed in the outside works or related plants—1 each from haulage, machinery, and handtools. Of the 1,748 nonfatal injuries reported, the greater number occurred in the open quarry and in surface operations, mainly from machinery, falls of persons, handling materials, and haulage.

The days worked were approximately the same as the previous year, but the average number of men working were reduced by 5 percent, while the man-hours were 6 percent lower than the number employed in 1953.

Limestone (Chief Product, Lime)

In the group of quarries producing limestone to be used chiefly in the manufacture of lime, including the limekilns associated with the quarries, 138 were reported active and the injury record was not as favorable as the previous year. An increase in the number of fatalities reported caused an overall injury-frequency rate of 24.83, a 2-percent increase over the 24.41 rate for 1953, although there were 69 fewer nonfatal injuries than were reported for the previous year. Of the 10 fatalities reported 9 occurred in the open quarry—4 from boiler and air-tank explosions, 2 each from falls of rock and explosives, and 1 from a haulage accident—and 1 in the outside works from machinery. Of the 457 nonfatal injuries reported at limerock quarries, the greater number occurred at the outside works, principally from handling materials, falls of persons, burns, falling objects, and machinery. The quarry injuries were caused mainly from handling materials, machinery, and haulage. The days active were the same as the previous year, with fewer men working, and the number of man-hours worked showed a decline of 13 percent.

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Marble

The safety record of the marble industry and associated plants was very favorable. No fatalities were reported in any of the 56 active operations, and a slight decline in the number of nonfatal injuries was reflected in the injury-frequency rate of 29.85 for 1954 from 32.52 in 1953. The greater number of injuries occurred in the open quarry while handling materials and drilling or channeling. At the outside works or associated plants, the greatest number of injuries were due to handling materials, falling objects, falls of persons, and machinery. A greater number of men were employed in 1954, with a slight increase in the number of days worked and a 7-percent rise in the number of man-hours worked.

Sandstone

The injury record for the 177 active sandstone quarries and plants in 1954 was improved. No fatal injuries and a decrease of 106 in the number of nonfatal injuries resulted in a decline of 5 percent in the injury-frequency rate, from 43.97 in 1953 to 41.70 in 1954. Of the 262 nonfatal injuries reported, the greater number occurred in the open quarry, mainly from handling materials, falls of rock, handtools, falls of persons, and machinery. In the outside works or plants, most of the injuries were caused by falls of persons, machinery, and handling material. Fewer men worked in 1954, and the days active were reduced by 26, with a 25 percent reduction in the number of man-hours of employment.

Slate

Operators of the 54 active slate quarries and associated plants reported no fatal injuries for 1954 and a slight reduction in the number of nonfatal injuries, with a greater proportionate decrease in man-hours of employment, which resulted in an increase in the injury-frequency rate from 51.73 in 1953 to 55.25 in 1954 or an increase of 7 percent. The number of man-hours worked at slate quarries declined 9 percent and the number of men employed 10 percent in 1954, as compared with the previous year. Of the 181 nonfatal injuries reported, most of them occurred in the open quarry and were from handling materials, haulage, falls of rock, flying objects, and handtools. In the associated plants most injuries were caused by handtools, handling materials, and machinery.

Traprock

The injury record for the 147 active traprock quarries and related industries for 1954 was not as favorable as that for the previous year. Two fatalities and 248 nonfatal injuries were reported, showing a combined injury-frequency rate of 43.00, an increase of 11 percent from the 38.65 in 1953. The 2 fatalities occurred in the open quarry; 1 was caused by a falling object and 1 while working with or around machinery. Most of the nonfatal injuries also occurred in the open quarry, the majority from handling materials, machinery, and falls of persons. The industry, employing 55 less men, worked the same number of days in 1954 as in 1953, with a decrease of 3 percent in the number of man-hours of employment.

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TABLE 4.—*Injury experience and employment data on the quarrying industry of the United States, by kind of stone, 1954*

Kind of stone	Number of injuries						Injury frequency per million man-hours						Widows	Orphans	Average hours worked per man-day			Average hours worked per man per year		
	Fatal			Nonfatal			Fatal			Nonfatal										
	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total			Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total
Cement rock [1]	1	5	6	64	258	322	0.11	0.08	0.08	7.36	4.14	4.53	5	6	8.03	8.00	8.00	2,171	2,630	2,564
Granite	4	----	4	285	172	457	.57	----	.31	40.86	28.46	35.10	2	1	8.31	8.26	8.29	2,006	2,020	2,012
Limestone	9	3	12	1,341	407	1,748	.24	.20	.23	36.16	26.88	33.47	5	10	8.40	8.38	8.39	1,967	2,050	1,990
Limestone (chief product, lime)	9	1	10	220	237	457	1.61	.08	.53	39.45	17.91	24.30	6	7	7.97	8.04	8.02	2,170	2,444	2,336
Marble	----	----	----	73	86	159	----	----	----	41.34	24.15	29.85	----	----	8.30	8.26	8.27	1,930	2,167	2,082
Sandstone	----	----	----	190	72	262	----	----	----	50.19	28.82	41.70	----	----	8.17	8.19	8.18	1,731	1,945	1,870
Slate	----	----	----	150	31	181	----	----	----	96.00	18.09	55.25	----	----	8.07	8.59	8.33	2,086	2,264	2,175
Traprock	2	----	2	197	51	248	.47	----	.34	46.44	32.43	42.66	1	----	8.58	8.50	8.56	1,995	1,892	1,966
Total	25	9	34	2,520	1,314	3,834	.36	.08	.19	36.16	12.38	21.81	19	24	8.29	8.10	8.18	1,998	2,411	2,228

Kind of stone	Number of operations [2]	Men at work			Man-days worked			Average days active			Man-hours worked		
		Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total
Cement rock [1]	175	4,006	23,712	27,718	1,083,446	7,796,358	8,879,804	270	329	320	8,696,184	62,361,828	71,058,012
Granite	203	3,477	2,992	6,469	839,303	731,929	1,571,232	241	245	243	6,975,674	6,042,983	13,018,657
Limestone	1,302	18,859	7,387	26,246	4,417,458	1,807,260	6,224,718	234	245	237	37,087,117	15,143,975	52,231,092
Limestone (chief product, lime)	138	2,570	5,415	7,985	699,534	1,645,608	2,345,142	272	304	294	5,576,707	13,232,424	18,809,131
Marble	56	915	1,643	2,558	212,843	431,030	643,873	233	262	252	1,765,775	3,560,766	5,326,541
Sandstone	177	2,187	1,284	3,471	463,145	305,107	768,252	212	238	221	3,785,468	2,497,888	6,283,356
Slate	54	749	757	1,506	193,663	199,607	393,270	259	264	261	1,562,456	1,713,818	3,276,274
Traprock	147	2,126	831	2,957	494,471	184,997	679,468	233	223	230	4,241,653	1,572,434	5,814,087
Total	2,252	34,889	44,021	78,910	8,403,863	13,101,896	21,505,759	241	298	273	69,691,034	106,126,116	175,817,150

[1] Includes limestone or other stone used in the manufacture of cement.

[2] Includes a small number of mills or other plants not operated in connection with quarries.

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TABLE 5.—*Number of injuries in all stone quarries and mines in the United States, by place, kind of stone, and agency, 1954*

Degree of injury and kind of stone	Open quarry																														Total
	In quarry															Surface															
	Falls or slides of rock or overburden	Handling materials	Handtools	Explosives	Haulage	Falls of persons	Falling objects (other than 1 and 2)	Flying objects	Electricity	Drilling or channeling (by machine or hand)	Machinery	Stepping on nail or sharp object	Boiler and air-tank explosions	Burns from flames and hot or caustic materials	Other causes	Total in quarry	Quarry or mine cars and motors	Railway cars and locomotives	Run or fall of stone in or from bins	Falls of persons	Stepping on nail or sharp object	Handtools	Electricity	Machinery	Handling materials	Other causes	Total surface	
Fatal:																															
Cement rock [1]																															
Granite	1				1	1		1								4															4
Limestone		1			1	2	1									5		1	1							1	3	8	9
Limestone (chief product, lime)	2			2	1								4			9														
Marble																															
Sandstone																															
Slate																															
Traprock							1				1					2															2
Total	3	1		2	3	3	2	1			1		4			20		1	1							1	3	23	
Nonfatal:																															
Cement rock [1]	7	5	1	1	4	9	2	1	1	9	4				8	52	1	1		1		2		3	1	9	61			
Granite	9	46	16	1	13	34	10	19	3	18	25	2		2	33	231		2	5	6		4		9	19	9	54	285		
Limestone	33	118	54	20	108	127	29	79	4	66	109	29	1	15	115	907	8	12	18	45	10	37	2	71	39	72	314	1,221		
Limestone (chief product, lime)	8	20	3	5	13	10	4	10	1	9	16	1		3	14	117	1	12	4	6	3	5	1	4	20	13	69	186		
Marble	3	10	6		3	6	5	5		8	6			1	12	65												65		
Sandstone	16	83	12	1	7	13	5	9		4	12	1		3	6	172			1	1		3		1	3	6	15	187		
Slate	18	26	7		2	2	2	9		4	2	2			16	90	14		4	4	1			2	13	15	53	143		
Traprock	9	19	12		12	11		8		10	13	6		1	23	124	3	6	1	14	2	7		10	17	13	73	197		
Total	103	327	111	28	162	212	57	140	9	128	187	41	1	25	227	1,758	27	33	33	77	16	58	3	97	114	129	587	2,345		

[1] See footnote at end of table.

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TABLE 5.—*Number of injuries in all stone quarries and mines in the United States, by place, kind of stone, and agency, 1954*—Continued

| Degree of injury and kind of stone | Underground mine | | |

Degree of injury and kind of stone	Crusher and mill											Processing works	Auxiliary works														Grand total
	Haulage	Machinery	Handtools	Stepping on nail or sharp object	Electricity	Falls of persons	Falling objects (rocks, timbers, etc.)	Flying objects	Handling materials	Burns	Other causes	Total crusher and mill	Quarry or mine cars and motors	Railway cars and locomotives	Falls of persons	Falling objects (rocks, timbers, etc.)	Stepping on nail or sharp object	Handtools	Electricity	Machinery	Handling materials	Other causes	Total auxiliary works	Total	
Fatal:																									
Cement rock [1]						1						1		1	2	1							4	5	6
Granite																									4
Limestone	1	1	1									3												3	12
Limestone (chief product, lime)		1										1												1	10
Marble																									
Sandstone																									
Slate																									
Traprock																									2
Total	1	2	1			1						5		1	2	1							4	9	34
Nonfatal:																									
Cement rock [1]	6	27	4		1	37	10	7	18	18	57	185		4	12	4	1	6	1	11	12	22	73	258	322
Granite	10	21	19		3	23	10	14	36	3	16	157	1		3	2				1	5	3	15	172	457
Limestone	34	93	23	2		47	32	22	68	8	58	391			2			1		3	4	5	16	407	1,748
Limestone (chief product, lime)	9	16	14	6		23	13	11	36	23	24	173		2	6	10		4	3	5	17	17	64	237	457
Marble		5	1	3	1	2	7	1	7	3	18	44			5	10		2		3	15	7	42	86	159
Sandstone	3	8	2			4	4	5	3		4	33			12	4		1	5	3	7	7	39	72	262
Slate		4	7	1					8	1	2	23				2		3		2		1	8	31	181
Traprock	2	7	3	1		8	2	7	9	1	6	46			3							2	5	51	248
Total	64	181	73	13	5	144	78	67	185	57	185	1,052	1	6	43	32	2	17	9	28	60	64	262	1,314	3,834

[1] Includes limestone or other stone used in the manufacture of cement.

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INJURY EXPERIENCE BY STATES

A study of the reports received from operators of quarries and mines, with their associated plants employing 1,000 or more men, revealed that of the 26 States represented, 13 reported no fatalities. Those 13 States, in order of their volume of employment, were: California, Illinois, Texas, New York, Alabama, Florida, Kansas, Minnesota, Wisconsin, North Carolina, Massachusetts, Maryland, and Washington. Four other States in this group had fatality rates more favorable than the average rate for the entire quarrying industry, and 13 States had a nonfatal-injury-frequency rate lower than the entire industry.

TABLE 6.—*Relative standing of States, by average daily employment and fatal- and nonfatal-injury-frequency rates, 1954* [1]

Relative standing	State	Employment	Relative standing	State	Fatality rate	Relative standing	State	Nonfatal-injury rate
1	Pennsylvania	10, 224	1	California		1	Michigan	7. 91
2	Ohio	6, 466	2	Illinois		2	California	13. 59
3	California	4, 356	3	Texas		3	Alabama	13. 95
4	Indiana	4, 204	4	New York		4	Pennsylvania	15. 21
5	Missouri	4, 039	5	Alabama		5	Washington	15. 35
6	Illinois	3, 558	6	Florida		6	Illinois	16. 11
7	Tennessee	3, 467	7	Kansas		7	Iowa	16. 18
8	Michigan	3, 058	8	Minnesota		8	West Virginia	16. 40
9	New York	2, 913	9	Wisconsin		9	Kansas	17. 38
10	Texas	2, 579	10	North Carolina		10	Ohio	18. 56
11	Virginia	2, 560	11	Massachusetts		11	Indiana	18. 57
12	Alabama	2, 468	12	Maryland		12	Oklahoma	20. 83
13	Georgia	2, 200	13	Washington		13	Texas	21. 04
14	Iowa	2, 088	14	Indiana	0. 10	14	New York	22. 64
15	Wisconsin	1, 758	15	Missouri	. 12	15	Missouri	24. 25
16	Vermont	1, 675	16	Ohio	. 13	16	North Carolina	24. 95
17	Kansas	1, 666	17	Michigan	. 13	17	Georgia	25. 80
18	Minnesota	1, 632	18	Virginia	. 18	18	Tennessee	29. 08
19	Kentucky	1, 596	19	Iowa	. 20	19	Kentucky	31. 46
20	Florida	1, 513	20	Georgia	. 21	20	Virginia	33. 70
21	West Virginia	1, 491	21	Pennsylvania	. 26	21	Massachusetts	34. 01
22	North Carolina	1, 407	22	Tennessee	. 42	22	Florida	34. 50
23	Oklahoma	1, 266	23	Kentucky	. 65	23	Vermont	34. 57
24	Massachusetts	1, 141	24	Oklahoma	. 69	24	Minnesota	34. 72
25	Washington	1, 062	25	West Virginia	1. 00	25	Maryland	39. 94
26	Maryland	1, 009	26	Vermont	1. 44	26	Wisconsin	47. 21
	United States total	78, 910		United States average	. 19		United States average	21. 81

[1] Includes only those States wherein 1,000 or more men were employed.

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TABLE 7.—*Number of active stone quarries and mines, men working, man-days worked, and man-hours worked at all stone quarries and mines in the United States, by States, 1954*

State	Number of active operations [1]	Men at work								
		Open quarry	Underground mine	Processing works						
				Crusher	Sawing and finishing plant	Granules and flour plant	Cement mill	Limekiln	Auxiliary works	Total
Alabama	39	803	136	271	202	25	526	150	355	2,468
Arizona	17	190		34			45	18	38	325
Arkansas	9	88	31	15		19	68	52	46	319
California	79	1,229	82	384	50	53	1,589	40	929	4,356
Colorado	44	278	7	79	9		144		107	624
Connecticut	23	192		88	10	5		4	24	323
Florida	40	804		326			266	9	108	1,513
Georgia	46	1,195	16	283	401	57	185		63	2,200
Idaho	7	86		11			48			145
Illinois	123	1,828	223	478		44	507	103	375	3,558
Indiana	71	1,465	19	213	1,104		1,107		296	4,204
Iowa	127	951	9	290	1		775		62	2,088
Kansas	64	551	111	239	50	1	346		368	1,666
Kentucky	68	688	369	321			207		11	1,596
Maine	7	129	26	7	122		140		19	443
Maryland	24	376	5	263	2	9	252	19	83	1,009
Massachusetts	27	577		85	230	12		42	195	1,141
Michigan	26	978	7	489	2		1,228	33	321	3,058
Minnesota	68	365		134	842	9	185	11	86	1,632
Missouri	176	1,434	448	421	46	38	666	405	581	4,039
Montana	16	117		45			54	14	42	272
Nebraska	32	471		41		13	157		87	769
Nevada	9	81	3	8		3		28	37	160
New Jersey	21	524		131	10	13		3	107	788
New Mexico	6	21		28				8	2	59
New York	66	1,393		319	44	32	674	44	407	2,913
North Carolina	33	760		381	225				41	1,407
Ohio	126	2,283	320	773	575	17	612	802	1,084	6,466
Oklahoma	13	250	11	104	36		419	31	415	1,266
Oregon	33	207		77		2	169		51	506
Pennsylvania	191	3,572	952	790	339	99	2,909	247	1,316	10,224
Rhode Island	4	47		7	20					74
South Carolina	7	238		105			72		84	499
South Dakota	17	326		41	98		77	2	83	627
Tennessee	116	1,735	92	481	371		519	53	216	3,467
Texas	37	564		251	145		1,086	166	367	2,579
Utah	16	141		27			108	4	75	355
Vermont	42	887	40	68	564	76		1	39	1,675
Virginia	79	1,273	148	360	126	22	293	143	195	2,560
Washington	56	463	1	114	34	10	395	16	29	1,062
West Virginia	24	554	244	206	17	53	179	94	144	1,491
Wisconsin	197	1,032		261	152	32	115	62	104	1,758
Wyoming	19	321	49	90			88		23	571
Other States [2]	7	73		39	53		424		66	655
Total	2,252	31,540	3,349	9,178	5,880	644	16,634	2,604	9,081	78,910

See footnotes at end of table.

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TABLE 7.—*Number of active stone quarries and mines, men working, man-days worked, and man-hours worked at all stone quarries and mines in the United States, by States, 1954*—Continued

State	Man-days worked								
	Open quarry	Underground mine	Processing works						
			Crusher	Sawing and finishing plant	Granules and flour plant	Cement mill	Limekiln	Auxiliary works	Total
Alabama	206,048	31,174	68,348	50,518	6,787	179,211	49,513	110,740	702,339
Arizona	50,887		10,458			16,248	5,727	12,321	95,641
Arkansas	27,642	9,423	4,575		5,000	24,885	18,720	16,669	106,914
California	316,904	18,922	97,983	12,223	14,622	512,542	12,398	279,523	1,265,117
Colorado	45,663	1,760	14,978	2,010		52,598		38,999	156,008
Connecticut	49,597		23,339	2,715	1,545		1,460	6,932	85,588
Florida	218,499		94,417			80,043	2,092	29,059	424,110
Georgia	309,651	3,120	73,616	98,515	14,520	68,514		16,189	584,125
Idaho	14,205		2,955			14,629			31,789
Illinois	431,411	52,862	114,550		12,084	175,749	36,146	110,551	933,353
Indiana	361,351	5,504	56,503	273,374		403,945		78,963	1,179,640
Iowa	220,979	2,700	70,106	200		257,153		20,165	571,303
Kansas	114,347	29,778	54,935	14,760	50	123,843		97,988	435,701
Kentucky	147,696	78,635	62,967			75,545		4,015	368,858
Maine	30,956	6,578	2,037	22,884		47,351		4,768	114,574
Maryland	98,645	1,243	79,488	601	1,800	68,282	5,260	22,076	277,395
Massachusetts	146,889		21,943	57,917	3,446		14,631	54,158	298,984
Michigan	271,778	622	131,231	360		443,144	11,960	100,825	959,920
Minnesota	71,383		25,267	216,198	2,008	67,518	3,590	24,177	410,141
Missouri	262,612	120,267	93,917	13,051	11,005	242,912	145,419	170,479	1,059,662
Montana	15,359		5,457			19,775	2,166	15,081	57,838
Nebraska	121,674		11,464		4,014	57,133		31,770	226,055
Nevada	21,330	275	2,298		390		8,178	10,812	43,283
New Jersey	140,834		30,060	2,682	3,934		131	27,138	204,779
New Mexico	3,624		3,193				2,312	604	9,733
New York	332,632		71,657	10,076	8,639	216,414	13,387	107,013	759,818
North Carolina	171,598		91,141	55,792				10,194	328,725
Ohio	601,613	94,982	219,006	137,323	5,973	219,032	251,809	334,794	1,864,532
Oklahoma	68,249	2,750	29,000	9,151		119,502	11,435	114,785	354,872
Oregon	37,456		15,558		520	58,316		17,214	129,064
Pennsylvania	884,970	213,617	196,584	94,705	27,593	997,587	74,751	374,933	2,864,740
Rhode Island	11,352		1,800	4,936					18,088
South Carolina	58,502		25,056			26,384		21,840	131,782
South Dakota	87,360		11,448	19,753		28,243	520	25,516	172,840
Tennessee	397,604	23,702	111,938	91,899		166,496	16,765	63,039	871,443
Texas	160,106		73,112	40,198		388,903	53,718	116,329	832,366
Utah	30,801		5,362			36,258	643	22,371	95,435
Vermont	217,232	10,640	19,687	146,281	22,743		295	10,367	427,245
Virginia	314,472	39,609	86,648	33,195	5,194	103,935	43,386	54,848	681,287
Washington	75,948	287	16,575	7,285	1,843	120,956	5,520	7,983	236,397
West Virginia	122,721	57,374	41,781	5,100	13,207	61,286	28,226	39,239	368,934
Wisconsin	212,623		42,778	37,886	8,389	40,037	20,695	26,552	388,960
Wyoming	80,764	12,603	20,257			32,174		8,371	154,169
Other States [2]	19,469		11,462	13,398		154,294		23,589	222,212
Total	7,585,436	818,427	2,246,935	1,474,986	175,306	5,700,837	840,853	2,662,979	21,505,759

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TABLE 7.—*Number of active stone quarries and mines, men working, man-days worked, and man-hours worked at all stone quarries and mines in the United States, by States, 1954*—Continued

State	Man-hours worked								
	Open quarry	Underground mine	Processing works						
			Crusher	Sawing and finishing plant	Granules and flour plant	Cement mill	Limekiln	Auxiliary works	Total
Alabama	1,655,356	250,854	560,126	410,552	61,086	1,437,215	396,011	890,460	5,661,660
Arizona	407,096		83,665			129,984	45,813	98,568	765,126
Arkansas	221,144	75,386	36,600		40,005	199,076	149,760	133,354	855,325
California	2,548,208	151,381	794,014	100,247	123,011	4,100,339	99,182	2,236,738	10,153,120
Colorado	363,788	14,081	120,526	16,026		420,786		311,996	1,247,203
Connecticut	419,653		203,573	21,415	14,563		11,680	58,392	729,276
Florida	1,927,365		831,223			640,343	16,738	236,835	3,652,504
Georgia	2,613,848	31,200	638,226	789,138	120,180	511,581		141,599	4,845,772
Idaho	124,319		24,070			117,030			265,419
Illinois	3,505,538	432,597	946,299		104,706	1,406,574	289,165	887,211	7,572,090
Indiana	2,973,810	44,030	472,280	2,226,363		3,231,563		635,821	9,583,867
Iowa	2,003,511	27,000	630,387	1,800		2,057,238		161,321	4,881,257
Kansas	942,920	260,227	464,173	118,080	400	996,867		783,897	3,566,564
Kentucky	1,227,097	680,952	531,913			610,991		32,120	3,083,073
Maine	247,141	52,624	16,292	194,149		378,807		40,234	929,247
Maryland	832,841	9,940	643,110	4,808	14,400	546,258	44,777	182,111	2,278,245
Massachusetts	1,216,531		182,560	463,341	27,570		117,041	433,261	2,440,304
Michigan	2,188,520	4,973	1,063,253	2,845		3,545,166	95,680	806,593	7,707,030
Minnesota	623,499		229,631	1,818,268	18,075	540,145	28,752	198,018	3,456,388
Missouri	2,177,101	968,042	776,315	106,964	88,044	1,943,314	1,182,998	1,416,979	8,659,757
Montana	128,318		46,124			158,202	17,328	120,648	470,620
Nebraska	972,266		92,281		32,962	457,068		254,163	1,808,740
Nevada	170,642	2,200	18,384		3,120		65,424	86,496	346,266
New Jersey	1,268,716		262,373	21,456	36,596		1,175	259,333	1,849,649
New Mexico	28,992		25,544				18,496	4,832	77,864
New York	2,843,093		615,490	84,771	75,852	1,731,760	107,103	858,540	6,316,609
North Carolina	1,436,825		761,072	446,336				81,552	2,725,785
Ohio	4,931,753	761,866	1,779,640	1,123,854	47,784	1,752,395	2,008,557	2,682,240	15,088,089
Oklahoma	566,306	22,000	250,395	76,083		956,014	91,480	918,527	2,880,805
Oregon	299,657		124,463		4,160	466,524		137,712	1,032,516
Pennsylvania	7,306,428	1,707,703	1,631,868	750,284	238,766	8,073,362	600,663	2,964,296	23,273,370
Rhode Island	90,816		14,400	36,632					141,848
South Carolina	511,420		217,748			211,072		174,720	1,114,960
South Dakota	746,301		98,225	158,027		225,940	4,160	203,712	1,436,365
Tennessee	3,370,103	197,382	955,535	743,744		1,288,400	134,117	498,784	7,188,065
Texas	1,297,688		608,906	321,591		3,111,030	429,753	932,640	6,701,608
Utah	247,033		43,098			290,060	5,140	179,911	765,242
Vermont	1,739,946	79,643	157,470	1,179,781	225,744		2,360	86,263	3,471,207
Virginia	2,626,892	288,179	722,661	276,770	46,197	831,481	344,440	471,394	5,608,014
Washington	616,603	2,296	133,631	58,277	14,714	967,645	31,851	63,865	1,888,882
West Virginia	998,713	459,254	340,487	40,800	105,654	498,000	237,901	306,699	2,987,508
Wisconsin	1,833,458		373,393	304,821	67,932	320,297	165,554	217,578	3,283,033
Wyoming	655,786	100,820	162,186			257,390		66,967	1,243,149
Other States [2]	159,363		94,066	107,240		1,234,352		188,708	1,783,729
Total	63,066,404	6,624,630	18,777,676	12,004,463	1,511,521	45,644,269	6,743,099	21,445,088	175,817,150

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TABLE 7.—*Number of active stone quarries and mines, men working, man-days worked, and man-hours worked at all stone quarries and mines in the United States, by States, 1954*—Continued

State	Average days worked				Average hours of work per man per day			
	Open quarry	Underground mine	Processing works	Total	Open quarry	Underground mine	Processing works	Total
Alabama	257	229	304	285	8.03	8.05	8.07	8.06
Arizona	268	----	332	294	8.00	----	8.00	8.00
Arkansas	314	304	349	335	8.00	8.00	8.00	8.00
California	258	231	305	290	8.04	8.00	8.02	8.03
Colorado	164	251	320	250	7.97	8.00	8.00	8.00
Connecticut	258	----	275	265	8.46	----	8.60	8.52
Florida	272	----	290	280	8.82	----	8.39	8.61
Georgia	259	195	274	266	8.44	10.00	8.11	8.30
Idaho	165	----	298	219	8.75	----	8.02	8.35
Illinois	236	237	298	262	8.13	8.18	8.09	8.11
Indiana	247	290	299	281	8.23	8.00	8.08	8.12
Iowa	232	300	308	271	9.07	10.00	8.20	8.74
Kansas	208	268	290	262	8.25	8.74	8.11	8.19
Kentucky	215	213	264	231	8.31	8.66	8.24	8.36
Maine	240	253	268	259	7.98	8.00	8.17	8.11
Maryland	262	249	283	275	8.44	8.00	8.09	8.21
Massachusetts	255	----	270	262	8.28	----	8.05	8.16
Michigan	278	89	332	314	8.05	8.00	8.02	8.03
Minnesota	196	----	267	251	8.73	----	8.36	8.43
Missouri	183	268	314	262	8.29	8.05	8.15	8.17
Montana	131	----	274	213	8.35	----	8.06	8.14
Nebraska	258	----	350	294	7.99	----	8.01	8.00
Nevada	263	92	285	271	8.00	8.00	8.00	8.00
New Jersey	269	----	242	260	9.01	----	9.08	9.03
New Mexico	173	----	161	165	8.00	----	8.00	8.00
New York	239	----	280	262	8.55	----	8.13	8.31
North Carolina	226	----	243	234	8.37	----	8.20	8.29
Ohio	264	297	302	288	8.20	8.02	8.04	8.09
Oklahoma	273	250	282	280	8.30	8.00	8.08	8.12
Oregon	181	----	306	255	8.00	----	8.00	8.00
Pennsylvania	248	224	310	240	8.26	7.99	8.07	8.12
Rhode Island	242	----	249	244	8.00	----	7.58	7.84
South Carolina	246	----	281	264	8.74	----	8.24	8.46
South Dakota	268	----	284	276	8.54	----	8.07	8.31
Tennessee	229	258	294	251	8.48	8.33	8.04	8.25
Texas	284	----	334	323	8.11	----	8.04	8.05
Utah	218	----	302	270	8.02	----	8.02	8.02
Vermont	245	266	267	255	8.01	7.49	8.28	8.12
Virginia	247	268	287	266	8.35	7.28	8.23	8.23
Washington	164	287	268	223	8.12	8.00	7.93	7.99
West Virginia	222	235	272	247	8.14	8.00	8.10	8.10
Wisconsin	206	----	243	221	8.62	----	8.22	8.44
Wyoming	272	257	302	270	8.12	8.00	8.00	8.05
Other States [2]	267	----	348	339	8.19	----	8.01	8.03
Total	241	244	298	273	8.31	8.09	8.10	8.18

[1] Includes a small number of mills or other plants not operated in connection with quarries.
[2] Includes Delaware, Louisiana, Mississippi, and New Hampshire.

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TABLE 8.—*Number of injuries and injury-frequency rates at all stone quarries and mines in the United States, 1954*

State	Number of injuries								Injury frequency per million man-hours							
	Fatal				Nonfatal				Fatal				Nonfatal			
	Open quarry	Underground mine	Processing works	Total	Open quarry	Underground mine	Processing works	Total	Open quarry	Underground mine	Processing works	Total	Open quarry	Underground mine	Processing works	Total
Alabama					37	7	35	79					22.35	27.90	9.32	13.95
Arizona	1			1	9		16	25	2.46			1.31	22.11		44.69	32.67
Arkansas					17	1	5	23					76.87	13.27	8.95	26.89
California					56	22	60	138					21.98	145.33	8.05	13.59
Colorado	1			1	52	1	2	55	2.75			.80	142.94	71.02	2.30	44.10
Connecticut	1			1	12		10	22	2.38			1.37	28.60		32.30	30.17
Florida					96		30	126					49.81		17.39	34.50
Georgia	1			1	73		52	125	.38			.21	27.93		23.63	25.80
Idaho							4	4							28.35	15.07
Illinois					89	4	29	122					25.39	9.25	7.98	16.11
Indiana			1	1	80	2	96	178			0.15	.10	26.91	45.42	14.62	18.57
Iowa	1			1	71		8	79	.50			.20	35.44		2.81	16.18
Kansas					20	10	32	62					21.21	38.43	13.54	17.38
Kentucky	2			2	51	32	14	97	1.63			.65	41.56	46.99	11.91	31.46
Maine					14	7	11	32					56.65	133.02	17.47	34.44
Maryland					57	1	33	91					68.44	100.60	22.99	39.94
Massachusetts					65		18	83					53.43		14.71	34.01
Michigan	1			1	32		29	61	.46			.13	14.62		5.26	7.91
Minnesota					49		71	120					78.59		25.06	34.72
Missouri		1		1	102	36	72	210		1.03		.12	46.85	37.19	13.06	24.25
Montana			1	1	4		3	7			2.92	2.12	31.17		8.76	14.87
Nebraska					4		3	7					4.11		3.59	3.87
Nevada					15		7	22					87.90		40.36	63.53
New Jersey	1			1	67		25	92	.79			.54	52.81		43.03	49.74
New Mexico							3	3							61.38	38.53
New York					80		63	143					28.14		18.14	22.64
North Carolina					39		29	68					27.14		22.50	24.95
Ohio	2			2	165	7	108	280	.41			.13	10.94	9.19	11.50	18.56
Oklahoma	1		1	2	41	1	18	60	1.77		.44	.69	72.40	45.45	7.85	20.83
Oregon					18		34	52					60.07		46.39	50.36
Pennsylvania	2	1	3	6	249	6	99	354	.27	.59	.21	.26	34.08	3.51	6.94	15.21
Rhode Island					8			8					88.09			56.40
South Carolina					20		13	33					39.11		21.54	29.60
South Dakota					26		8	34					34.84		11.59	23.67
Tennessee	2		1	3	147	6	56	209	.59		.28	.42	43.62	30.40	15.47	29.08
Texas					49		92	141					37.76		17.02	21.04
Utah					4		3	7					16.19		5.79	9.15
Vermont	5			5	85	7	28	120	2.87			1.44	48.85	87.89	16.95	34.57
Virginia	1			1	163	7	19	189	.38			.18	62.05	24.29	7.06	33.70
Washington					22		7	29					35.68		5.51	15.35
West Virginia	1		2	3	23	7	19	49	1.00		1.31	1.00	23.03	15.24	12.42	16.40
Wisconsin					124		31	155					67.63		21.39	47.21
Wyoming					3	11	2	16					4.57	109.11	4.11	12.87
Other States[1]					7		17	24					43.92		10.47	13.45
Total	23	2	9	34	2,345	175	1,314	3,834	.36	.30	.08	.19	37.18	26.42	12.38	21.81

[1] Includes Delaware, Louisiana, Mississippi, and New Hampshire.

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TABLE 9.—*Number of injuries at all stone quarries and mines in the United States in 1954, by State and degree of injury*

State	Fatal	Nonfatal				Grand total
		Permanent total [1]	Permanent partial [2]	Temporary total [3]	Total nonfatal	
Alabama			6	73	79	79
Arizona	1			25	25	26
Arkansas				23	23	23
California			3	135	138	138
Colorado	1			55	55	56
Connecticut	1		2	20	22	23
Florida			2	124	126	126
Georgia	1	1	3	121	125	126
Idaho				4	4	4
Illinois			8	114	122	122
Indiana	1		12	166	178	179
Iowa	1	1	3	75	79	80
Kansas			1	61	62	62
Kentucky	2			97	97	99
Maine			1	31	32	32
Maryland			4	87	91	91
Massachusetts		1	1	81	83	83
Michigan	1		5	56	61	62
Minnesota			5	115	120	120
Missouri	1		14	196	210	211
Montana	1		1	6	7	8
Nebraska				7	7	7
Nevada				22	22	22
New Jersey	1		1	91	92	93
New Mexico				3	3	3
New York			6	137	143	143
North Carolina			4	64	68	68
Ohio	2	1	11	268	280	282
Oklahoma	2		1	59	60	62
Oregon				52	52	52
Pennsylvania	6	1	10	343	354	360
Rhode Island				8	8	8
South Carolina			1	32	33	33
South Dakota			1	33	34	34
Tennessee	3	1	7	201	209	212
Texas			13	128	141	141
Utah			1	6	7	7
Vermont	5		2	118	120	125
Virginia	1		4	185	189	190
Washington				29	29	29
West Virginia	3	1	1	47	49	52
Wisconsin			2	153	155	155
Wyoming				16	16	16
Other States [4]				24	24	24
Total	**34**	**7**	**136**	**3,691**	**3,834**	**3,868**

[1] Permanent total disability: The loss of, or loss of use of, both hands, or both arms, or both legs, or both feet, or both eyes, or any 2 thereof, or any injury (except death) that permanently and totally incapacitates the injured person from following any gainful occupation.

[2] Permanent partial disability: Loss of, or loss of use of, 1 foot, leg, hand, arm, or eye; or loss of part of bone of 1 of the foregoing; or loss of, or loss of use of, 1 or more fingers, or 1 great toe, or any 2 or more toes; or the permanent impairment of use of any part of the body.

[3] Temporary injuries: Disability for more than the remainder of the day of accident.

[4] Includes Delaware, Louisiana, Mississippi, and New Hampshire.

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TABLE 10.—*Number of fatal injuries at all stone quarries and mines in the United States, by agency and State, 1954*

State	Open quarry																
	In quarry																
	Falls or slides of rock or overburden	Handling materials	Handtools	Explosives	Haulage	Falls of persons	Falling objects	Flying particles	Electricity	Drilling and channeling (by machine or hand)	Machinery	Stepping on nail or sharp object	Boiler and air-tank explosions	Burns from flames and hot or caustic materials	Other causes	Surface	Total
Alabama																	
Arizona	1																1
Arkansas																	
California																	
Colorado						1											1
Connecticut							1										1
Florida																	
Georgia					1												1
Idaho																	
Illinois																	
Indiana																	
Iowa						1											1
Kansas																	
Kentucky					1											1	2
Maine																	
Maryland																	
Massachusetts																	
Michigan							1										1
Minnesota																	
Missouri																	
Montana																	
Nebraska																	
Nevada																	
New Jersey											1						1
New Mexico																	
New York																	
North Carolina																	
Ohio						1										1	2
Oklahoma																1	1
Oregon																	
Pennsylvania		1			1												2
Rhode Island																	
South Carolina																	
South Dakota																	
Tennessee				2													2
Texas																	
Utah																	
Vermont								1					4				5
Virginia	1																1
Washington																	
West Virginia	1																1
Wisconsin																	
Wyoming																	
Other States [1]																	
Total	3	1		2	3	3	2	1			1		4			3	23

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TABLE 10.—*Number of fatal injuries at all stone quarries and mines in the United States, by agency and State, 1954*—Continued

State	Underground mines																				
	Underground																				
	Falls of rock from roof or wall	Handling rock while loading at working face or chute	Handtools	Explosives	Haulage	Falling down chute, winze, raise, or stope	Run of rock from chute	Drilling	Electricity	Machinery (other than locomotives or drills)	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail or sharp object	Handling material (other than rock)	Other causes	Total underground	Shaft and slope	Surface	Total
Alabama																					
Arizona																					
Arkansas																					
California																					
Colorado																					
Connecticut																					
Florida																					
Georgia																					
Idaho																					
Illinois																					
Indiana																					
Iowa																					
Kansas																					
Kentucky																					
Maine																					
Maryland																					
Massachusetts																					
Michigan																					
Minnesota																					
Missouri			1														1			1	
Montana																					
Nebraska																					
Nevada																					
New Jersey																					
New Mexico																					
New York																					
North Carolina																					
Ohio																					
Oklahoma																					
Oregon																					
Pennsylvania	1																1			1	
Rhode Island																					
South Carolina																					
South Dakota																					
Tennessee																					
Texas																					
Utah																					
Vermont																					
Virginia																					
Washington																					
West Virginia																					
Wisconsin																					
Wyoming																					
Other States [1]																					
Total	1		1														2			2	

See footnote at end of table.

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TABLE 10.—*Number of fatal injuries at all stone quarries and mines in the United States, by agency and State, 1954*—Continued

State	Processing works													Grand total
	Haulage	Machinery	Handtools	Stepping on nail or sharp object	Electricity	Falls of persons	Falling objects (rocks, timbers, etc.)	Flying objects	Handling materials	Burns	Other causes	Auxiliary works	Total	
Alabama														
Arizona														1
Arkansas														
California														
Colorado														1
Connecticut														1
Florida														
Georgia												1	1	2
Idaho														
Illinois														
Indiana	1												1	1
Iowa														1
Kansas														
Kentucky														2
Maine														
Maryland														
Massachusetts														
Michigan														1
Minnesota														
Missouri														1
Montana						1							1	1
Nebraska														
Nevada														
New Jersey														1
New Mexico														
New York														
North Carolina														
Ohio														2
Oklahoma		1											1	2
Oregon														
Pennsylvania												3	3	6
Rhode Island														
South Carolina														
South Dakota														
Tennessee			1										1	3
Texas														
Utah														
Vermont														5
Virginia														1
Washington														
West Virginia		1											1	2
Wisconsin														
Wyoming														
Other States [1]														
Total	1	2	1			1						4	9	34

[1] Includes Delaware, Louisiana, Mississippi, and New Hampshire.

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TABLE 11.—*Number of nonfatal injuries at all stone quarries and mines in the United States, by agency and State, 1954*

State	Open quarry																
	In quarry																
	Falls or slides of rock or overburden	Handling materials	Handtools	Explosives	Haulage	Falls of persons	Falling objects	Flying objects	Electricity	Drilling and channeling (by machine or hand)	Machinery	Stepping on nail or sharp object	Boiler and air-tank explosions	Burns from flames and hot or caustic materials	Other causes	Surface	Total
Alabama	3	7	3	1	2	4	2	3			3				5	4	37
Arizona	1	3					1			2	1			1			9
Arkansas		8	3			2		1			3						17
California	4	2	3	1	4	9	1	2		3	4				6	17	56
Colorado	1	33	6		1	3		3		1	3				1		52
Connecticut		1	2				1			1		1			2	4	12
Florida	4	4	4	2	10	19		2		1	10	2		2	10	26	96
Georgia	3	9	5	1	4	9	1	1	2	10	9			1	11	7	73
Idaho																	
Illinois	1	9	4	3	6	10	1	5		4	13	1			8	24	89
Indiana	3	6	2	1	1	11	5	14		10	9	1			7	10	80
Iowa	1	7	4		5	14	3	9	1	2	5	1		1	8	10	71
Kansas		4			1	1				5	3	1				5	20
Kentucky	2	1	3	3	12	4				6	2				6	12	51
Maine		1				1					1					11	14
Maryland	1	3	5		3	4	3	1		3	5	5		1	8	15	57
Massachusetts		9			1	4		16		3	3	1				15	13	65
Michigan		4	1	1	1	6	1	7		2	1			1		7	32
Minnesota	3	9	2	1	6			7		6	5			2	2	6	49
Missouri		5		2	18	12	1	6		5	18	1			12	22	102
Montana				1							3						4
Nebraska											1				2	1	4
Nevada		3		2	3										4	3	15
New Jersey	5	5	2		7	6			2	1	4	3			6	26	67
New Mexico																	
New York	3	9	7	1	2	3	2	1		1	5	5		1	10	30	80
North Carolina	2	7	2		2	6	1	1		5	4				2	7	39
Ohio	7	8	13		7	18	2	8	1	2	14	7		2	19	57	165
Oklahoma		6	4		6	8	1				1	3			6	6	41
Oregon	4	1			2	2				2	1				2	4	18
Pennsylvania	24	24	4		15	9	10	11		13	12	2	1	3	14	107	249
Rhode Island		1										1			1	5	8
South Carolina	2	2				1	1				3				1	10	20
South Dakota		1	3		3	2		1			4			2	1	9	26
Tennessee	9	42	4	4	6	7	2	13	1	11	7			3	17	21	147
Texas		5	1	2	10	2		4	1	3	1				1	19	49
Utah					2	1		1									4
Vermont	6	19	6		2	8	7	3		3	3	1		1	9	17	85
Virginia	8	27	9		12	11	1	11		8	8	3		1	22	42	163
Washington	2	1	4			1	1			3	2				1	7	22
West Virginia	1	3			3			1		3	1				2	9	23
Wisconsin	3	37	5	2	4	13	7	7	1	9	14	2		3	6	11	124
Wyoming							1									2	3
Other States [1]		1			1	1	1	1			1					1	7
Total	103	327	111	28	162	212	57	140	9	128	187	41	1	25	227	587	2,345

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TABLE 11.—*Number of nonfatal injuries at all stone quarries and mines in the United States, by agency and State, 1954*—Continued

State	Underground mines																				
	Underground																				
	Falls of rock from roof or wall	Handling rock while loading at working face or chute	Handtools	Explosives	Haulage	Falling down chute, winze, raise, or stope	Run of rock from chute or pocket	Drilling	Electricity	Machinery (other than locomotives or drills)	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail or sharp object	Handling materials (other than rock)	Other causes	Total underground	Shaft or slope	Surface	Total
Alabama	1		2		2											2	7			7
Arizona																				
Arkansas	1															1	1			1
California		3	6					7							4		20	2		22
Colorado															1		1			1
Connecticut																				
Florida																				
Georgia																				
Idaho																				
Illinois	1					1				1							3		1	4
Indiana			1					1									2			2
Iowa																				
Kansas	2		1	2	1			3									9		1	10
Kentucky		1	3	1				3						1		9	18		14	32
Maine	1	1			3			1								1	7			7
Maryland								1									1			1
Massachusetts																				
Michigan																				
Minnesota																				
Missouri	4	3	4		1	1		9		6				1	1	6	36			36
Montana																				
Nebraska																				
Nevada																				
New Jersey																				
New Mexico																				
New York																				
North Carolina																				
Ohio	1				1			2		1						2	7			7
Oklahoma				1													1			1
Oregon																				
Pennsylvania	3							1							1	1	6			6
Rhode Island																				
South Carolina																				
South Dakota																				
Tennessee		2						1							1	1	5		1	6
Texas																				
Utah																				
Vermont		1	2												3		6		1	7
Virginia	1			1		3		2									7			7
Washington																				
West Virginia		1			1			2		2							6		1	7
Wisconsin																				
Wyoming		2			1	3	1	3								1	11			11
Other States [1]																				
Total	15	14	19	5	10	8	1	36		10				2	11	23	154	2	19	175

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TABLE 11.—*Number of nonfatal injuries at all stone quarries and mines in the United States, by agency and State, 1954*—Continued

State	Processing works														Grand total
	Haulage	Machinery	Handtools	Stepping on nail or sharp object	Electricity	Falls of persons	Falling objects (rocks, timbers, etc.)	Flying objects	Handling materials	Burns	Other causes	Total processing works	Auxiliary works	Total	
Alabama		4				3	2	2	1		4	16	19	35	79
Arizona		3	2			2	1	3	1	2	2	16		16	25
Arkansas		4										4	1	5	23
California	4	5		1	1	6	4	3	11	2	7	44	16	60	138
Colorado		2										2		2	55
Connecticut	1	2					2		1			6	4	10	22
Florida	4	4	1			4	3	1	2	3	6	28	2	30	126
Georgia	3	5	7	1		4			6		16	42	10	52	125
Idaho						1					3	4		4	4
Illinois		5					1	2	2	2	1	13	16	29	122
Indiana	2	22	1	1		12	10	8	25	2	5	88	8	96	178
Iowa		2				1			3	1		7	1	8	79
Kansas	5	3	1			4			3	1	9	26	6	32	62
Kentucky		2	1				1	1	1		7	13	1	14	97
Maine		1						1	6		2	10	1	11	32
Maryland		3	4	1		7	1				17	33		33	91
Massachusetts		1				4			1		1	7	11	18	83
Michigan	2	1	2			4	1		2	2	10	24	5	29	61
Minnesota	6	12	4		3	12	2		21	2	6	68	3	71	120
Missouri	3	6	3			7	3	3	15	1	6	47	25	72	210
Montana									2			2	1	3	7
Nebraska		1	1						1			3		3	7
Nevada								1	4	2		7		7	22
New Jersey		4	2	1		2	2	5	6	1	2	25		25	92
New Mexico			1			1		1				3		3	3
New York	9	12	2			10	1	3	10	3	8	58	5	63	143
North Carolina		4	2			3	2	5	10		1	27	2	29	68
Ohio	4	3	10	2	1	12	7	5	4	7	16	71	37	108	280
Oklahoma		7				1	2		5		1	16	2	18	60
Oregon		4				6			3	3	13	29	5	34	52
Pennsylvania	9	17	10	5		6	2	4	6	3	7	69	30	99	354
Rhode Island															8
South Carolina		1				2	2	1	3	1	3	13		13	33
South Dakota						2					6	8		8	34
Tennessee	1	12	4			4	14	2	6	3	7	53	3	56	209
Texas	5	19	5			16	6	6	12	10	4	83	9	92	141
Utah	1											1	2	3	7
Vermont		1									6	7	21	28	120
Virginia	2	1				2	1	2	1	2	4	15	4	19	189
Washington									1			1	6	7	29
West Virginia	3	6				1	1		4	1	1	17	2	19	49
Wisconsin		2	5	1		3	4	4	6		4	29	2	31	155
Wyoming						1		1				2		2	16
Other States [1]			5			1	3	3		3		15	2	17	24
Total	64	181	73	13	5	144	78	67	185	57	185	1,052	262	1,314	3,834

[1] Includes Delaware, Louisiana, Mississippi, and New Hampshire.

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TABLE 12.—*Injury and employment data on cement operations, by States, 1954*

State	Fatal injuries			Nonfatal injuries			Widows	Orphans	Man-hours worked			Number of operations[1]	Men at work			Man-days worked			Average days active		
	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total			Quarry and mine	Processing works	Total		Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total
Alabama				3	10	13			382,563	2,283,211	2,665,774	12	181	869	1,050	47,607	284,473	332,080	263	327	316
California				16	22	38			1,274,227	6,389,249	7,663,476	14	572	2,515	3,087	159,278	798,655	957,933	278	318	310
Illinois									363,031	2,140,391	2,503,422	4	159	832	991	45,272	267,313	312,585	285	321	315
Indiana					13	13			224,262	3,833,466	4,057,728	4	103	1,385	1,488	28,032	479,183	507,215	272	346	341
Iowa					4	4			303,731	2,366,849	2,670,580	5	137	904	1,041	37,965	295,855	333,820	277	327	321
Kansas				3	6	9			375,598	1,901,828	2,277,426	8	172	771	943	46,949	236,963	283,912	273	307	301
Michigan					21	21			120,565	4,356,242	4,476,807	7	49	1,552	1,601	15,070	544,424	559,494	308	351	349
Missouri					1	1			333,926	2,530,864	2,864,790	5	159	921	1,080	41,731	316,347	358,078	262	343	332
New York				3	25	28			322,283	2,634,463	2,956,746	9	162	1,101	1,263	40,284	329,227	369,511	249	299	293
Ohio				7	9	16			507,389	3,074,458	3,581,847	10	231	1,155	1,386	62,759	383,603	446,362	272	332	322
Oregon				14	33	47			160,093	659,659	819,752	6	72	240	312	20,011	82,458	102,469	278	344	328
Pennsylvania	1	3	4	7	24	31	4	3	1,686,801	9,984,325	11,671,126	28	782	3,736	4,518	209,819	1,241,197	1,451,016	268	332	321
Tennessee				1	10	11			261,261	1,746,684	2,007,945	5	125	726	851	32,278	225,541	257,819	258	311	303
Texas				2	19	21			318,888	4,062,708	4,381,596	14	147	1,463	1,610	39,864	507,611	547,475	271	347	340
Virginia					1	1			186,177	982,592	1,168,769	4	90	361	451	23,956	123,347	147,303	266	342	327
Washington				2	5	7			271,410	1,069,400	1,340,810	7	153	442	595	33,168	133,647	166,815	217	302	280
West Virginia		1	1	2	2	4	1	3	270,385	702,150	972,535	3	142	293	435	33,736	87,677	121,413	238	299	279
Other States[2]		1	1	4	53	57			1,333,594	11,643,289	12,976,883	30	570	4,446	5,016	165,667	1,458,837	1,624,504	291	328	324
Total	1	5	6	64	258	322	5	6	8,696,184	62,361,828	71,058,012	175	4,006	23,712	27,718	1,083,446	7,796,358	8,879,804	270	329	320

[1] Includes a small number of mills or other plants not operated in connection with quarries.
[2] Includes Arizona, Arkansas, Colorado, Florida, Georgia, Idaho, Kentucky, Louisiana, Maine, Maryland, Minnesota, Mississippi, Montana, Nebraska, Oklahoma, South Carolina, South Dakota, Utah, Wisconsin, and Wyoming.

TABLE 13.—*Injury and employment data on granite operations, by States, 1954*

State	Fatal injuries			Nonfatal injuries			Widows	Orphans	Man-hours worked			Number of operations[1]	Men at work			Man-days worked			Average days active		
	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total			Quarry and mine	Processing works	Total		Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total
California				7	9	16			488,649	192,323	680,972	25	235	96	331	60,513	22,913	83,426	258	239	252
Connecticut				1		1			33,254	23,695	56,949	6	21	11	32	4,155	3,000	7,155	198	273	224
Georgia	1		1	55	31	86	1	1	1,953,152	1,072,816	3,025,968	35	897	520	1,417	230,316	128,696	359,012	257	247	253
Maine				11	1	12			102,380	96,952	199,332	4	67	71	138	12,797	12,119	24,916	191	171	181
Maryland				3	2	5			113,845	5,400	119,245	3	46	2	48	12,677	600	13,277	276	300	277
Massachusetts				35	7	42			497,274	628,938	1,126,212	9	252	313	565	62,376	78,617	140,993	248	251	250
Minnesota				8	54	62			211,845	1,825,988	2,037,833	25	121	855	976	25,406	216,565	241,971	210	253	248
North Carolina				25	22	47			1,124,775	927,652	2,052,427	21	590	467	1,057	133,416	113,702	247,118	226	243	234
Oklahoma				4	7	11			34,334	80,373	114,707	3	16	38	54	4,198	9,656	13,854	262	254	257
Pennsylvania				6		6			38,640	44,100	82,740	4	19	25	44	4,829	5,512	10,341	254	220	235
Rhode Island				7		7			72,896	37,592	110,488	3	39	21	60	9,112	5,056	14,168	234	241	236
South Carolina				19	4	23			470,844	202,548	673,392	5	218	97	315	53,430	23,156	76,586	245	239	243
South Dakota				20		20			143,322	166,219	309,541	7	66	103	169	17,414	20,777	38,191	264	202	226
Vermont	1		1	31		31	1		770,244	18,656	788,900	6	401	10	411	96,276	2,332	98,608	240	233	240
Virginia	1		1	21		21			312,983	55,516	368,499	8	155	29	184	37,133	6,633	43,766	240	229	238
Wisconsin				10	5	15			207,557	226,444	434,001	8	105	114	219	25,945	28,306	54,251	247	248	248
Wyoming									106,432	60,192	166,624	3	54	45	99	13,304	7,524	20,828	246	167	210
Other States[2]	1		1	22	30	52			293,248	377,579	670,827	28	175	175	350	36,006	46,765	82,771	206	267	236
Total	4		4	285	172	457	2	1	6,975,674	6,042,983	13,018,657	203	3,477	2,992	6,469	839,303	731,929	1,571,232	241	245	243

[1] Includes a small number of mills or other plants not operated in connection with quarries.
[2] Includes Arizona, Colorado, Delaware, Missouri, Montana, Nevada, New Hampshire, New Jersey, Oregon, Tennessee, Texas, Utah, and Washington.

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TABLE 14.—*Injury and employment data on limestone operations, by States, 1954*

State	Fatal injuries			Nonfatal injuries			Widows	Orphans	Man-hours worked			Number of operations[1]	Men at work			Man-days worked			Average days active		
	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total			Quarry and mine	Processing works	Total		Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total
Alabama				18	3	21			813,546	609,930	1,423,476	15	426	312	738	98,258	74,465	172,723	231	239	234
California				22	15	37			260,112	168,551	428,663	11	127	76	203	32,043	19,969	52,012	252	263	256
Colorado				10	1	11			75,215	94,240	169,455	8	70	64	134	9,401	11,780	21,181	134	184	158
Connecticut					2	2			21,758	46,323	68,081	3	12	18	30	3,041	5,148	8,189	253	286	273
Florida				96	24	120			1,865,315	796,183	2,661,498	38	779	314	1,093	210,744	90,037	300,781	271	287	275
Georgia				14	7	21			281,652	99,128	380,780	6	121	44	165	33,025	11,855	44,880	273	269	272
Illinois				89	9	98			3,525,836	846,224	4,372,060	111	1,864	433	2,297	432,842	100,849	533,691	232	233	232
Indiana		1	1	82	83	165	1	3	2,784,042	2,732,561	5,516,603	66	1,377	1,335	2,712	337,631	333,602	671,233	245	250	248
Iowa	1		1	71	4	75			1,726,780	483,897	2,210,677	122	823	224	1,047	185,714	51,769	237,483	226	231	227
Kansas				25	25	50			792,014	437,364	1,229,378	55	478	223	701	93,081	51,763	144,844	195	232	207
Kentucky	2		2	83	5	88			1,909,392	531,913	2,341,305	66	1,017	321	1,338	214,011	62,967	276,978	210	196	207
Maryland				38	20	58			261,474	454,898	716,372	7	120	171	291	32,129	56,606	88,735	268	331	305
Michigan	1		1	31	2	33	1	2	2,058,821	1,020,314	3,079,135	15	928	473	1,401	255,567	125,969	381,536	275	266	272
Minnesota				41	16	57			380,303	348,410	728,713	40	229	181	410	42,058	39,885	81,943	184	220	200
Missouri	1		1	97	17	114			1,988,849	635,646	2,624,495	150	1,364	351	1,715	239,838	76,139	315,977	176	217	184
Montana				1		1			45,221	15,829	61,050	5	39	11	50	5,232	1,928	7,160	134	175	143
Nebraska				4	3	7			801,679	103,594	905,273	23	399	46	445	100,351	12,772	113,123	252	278	254
New York				47	21	68		1	1,987,136	487,227	2,474,363	41	966	243	1,209	226,163	55,310	281,473	234	228	233
North Carolina				6	6	12			219,004	237,802	456,806	7	123	119	242	27,025	28,355	55,380	220	238	229
Ohio	2		2	91	25	116			3,323,910	1,050,026	4,373,936	72	1,458	463	1,921	400,958	129,160	530,118	275	279	276
Oklahoma	1	1	2	37	10	47	2	3	413,498	177,569	591,067	7	182	71	253	49,241	19,897	69,138	271	280	273
Pennsylvania	1		1	114	31	145	1	1	4,051,280	888,824	4,940,104	75	2,124	425	2,549	488,386	105,669	594,055	230	249	233
South Dakota				1		1			363,087	64,926	428,013	5	161	27	188	42,222	7,497	49,719	262	278	264
Tennessee		1	1	72	12	84			2,069,860	800,868	2,870,728	90	1,044	406	1,450	242,205	93,245	335,450	232	230	231
Texas				38	36	74			699,638	647,059	1,346,697	11	289	277	566	85,347	77,880	163,227	295	281	288
Utah				2	1	3			153,792	51,156	204,948	5	84	33	117	19,146	6,251	25,397	228	189	217
Virginia				77	10	87			1,490,860	440,080	1,930,940	40	737	227	964	179,003	52,298	231,301	243	230	240
Washington									42,749	14,403	57,152	5	24	14	38	5,368	1,775	7,143	224	127	188
West Virginia				18	10	28			550,331	151,727	702,058	13	299	82	381	66,751	18,531	85,282	223	226	224
Wisconsin				97	6	103			1,308,750	469,339	1,778,089	166	750	294	1,044	147,252	54,325	201,577	196	185	193
Wyoming				14		14			584,728	80,842	665,570	12	289	38	327	71,882	10,089	81,971	249	266	251
Other States[2]				5	3	8			336,485	157,122	493,607	12	156	71	227	41,543	19,475	61,018	266	274	269
Total	9	3	12	1,341	407	1,748	5	10	37,087,117	15,143,975	52,231,092	1,302	18,859	7,387	26,246	4,417,458	1,807,260	6,224,718	234	245	237

[1] Includes a small number of mills or other plants not operated in connection with quarries.

[2] Includes Arizona, Arkansas, Idaho, Maine, Nevada, New Jersey, New Mexico, Rhode Island, South Carolina, and Vermont.

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TABLE 15.—*Injury and employment data on limestone (chief product, lime) operations, by States, 1954*

State	Fatal injuries			Nonfatal injuries			Widows	Orphans	Man-hours worked			Number of operations[1]	Men at work			Man-days worked			Average days active		
	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total			Quarry and mine	Processing works	Total		Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total
Alabama				17	18	35			417,114	546,784	963,898	8	196	215	411	56,302	68,685	124,987	287	319	304
Arizona	1		1	9	15	24			62,416	120,063	182,479	3	27	49	76	7,802	15,008	22,810	289	306	300
California				11	4	15			113,713	429,691	543,404	5	57	192	249	14,214	53,712	67,926	249	280	273
Illinois					7	7			26,400	474,920	501,320	6	11	168	179	3,300	59,365	62,665	300	353	350
Maryland				9	3	12			172,334	128,150	300,484	6	80	55	135	20,773	14,630	35,403	260	266	262
Massachusetts				1	3	4			90,694	371,806	462,500	3	34	148	182	10,572	46,179	56,751	311	312	312
Missouri				28	30	58			580,048	1,497,103	2,077,151	10	243	548	791	71,342	186,620	257,962	294	341	326
Nevada				13	6	19			123,688	156,528	280,216	3	57	67	124	15,461	19,566	35,027	271	292	282
Ohio				48	44	92			1,204,379	4,032,256	5,236,635	18	508	1,610	2,118	151,520	504,211	655,731	298	313	310
Pennsylvania	1		1	17	24	41	1	1	1,355,109	2,215,548	3,570,657	22	612	985	1,597	166,576	275,533	442,109	272	280	277
Tennessee	2		2	15	6	21	1	2	82,256	206,357	288,613	3	34	81	115	10,282	25,795	36,077	302	318	314
Texas				3	23	26			202,225	528,413	730,638	9	95	209	304	25,278	66,051	91,329	266	316	300
Virginia				21	8	29			511,857	901,282	1,413,139	12	247	372	619	67,500	108,831	176,331	273	293	285
West Virginia	1	1	2	3	2	5	2	3	280,516	398,745	679,261	4	165	183	348	35,016	48,016	83,032	212	262	239
Wisconsin				6	17	23			70,149	273,997	344,146	8	30	115	145	8,744	33,773	42,517	291	294	293
Other States[2]	4		4	19	27	46	2	1	283,809	950,781	1,234,590	18	174	418	592	34,852	119,633	154,485	200	286	261
Total	9	1	10	220	237	457	6	7	5,576,707	13,232,424	18,809,131	138	2,570	5,415	7,985	699,534	1,645,608	2,345,142	272	304	294

[1] Includes a small number of mills or other plants not operated in connection with quarries.

[2] Includes Arkansas, Colorado, Connecticut, Florida, Michigan, Minnesota, Montana, New Jersey, New Mexico, New York, Oklahoma, South Dakota, Utah, Vermont, and Washington.

TABLE 16.—*Injury and employment data on marble operations, by States, 1954*

State	Fatal injuries			Nonfatal injuries			Widows	Orphans	Man-hours worked			Number of operations[1]	Men employed			Man-days worked			Average days active		
	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total			Quarry and mine	Processing works	Total		Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total
Alabama				6	4	10			256,611	315,525	572,136	3	106	133	239	30,508	37,494	68,002	288	282	285
Missouri				8	22	30			106,216	676,328	782,544	3	51	257	308	13,277	76,291	89,568	260	297	291
Tennessee				19	21	40			582,508	774,431	1,356,939	13	319	380	699	65,576	94,226	159,802	206	248	229
Vermont				29	20	49			476,403	1,221,265	1,697,668	16	256	583	839	60,235	151,404	211,639	235	260	252
Other States[2]				11	19	30			344,037	573,217	917,254	21	183	290	473	43,247	71,615	114,862	236	247	243
Total				73	86	159			1,765,775	3,560,766	5,326,541	56	915	1,643	2,558	212,843	431,030	643,873	233	262	252

[1] Includes a small number of mills or other plants not operated in connection with quarries.

[2] Includes Arizona, California, Colorado, Georgia, Maryland, New Jersey, New Mexico, New York, North Carolina, Utah, Virginia, and Washington.

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TABLE 17.—*Injury and employment data on sandstone operations, by States, 1954*

State	Fatal injuries			Nonfatal injuries			Widows	Orphans	Man-hours worked			Number of operations[1]	Men at work			Man-days worked			Average days active		
	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total			Quarry and mine	Processing works	Total		Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total
Arizona									70,160	4,160	74,320	9	38	2	40	8,770	520	9,290	231	260	232
Arkansas				7	4	11			110,603	19,824	130,427	4	47	8	55	13,825	2,478	16,303	294	310	296
California				11	2	13			265,969	118,299	384,268	7	157	59	216	32,740	14,787	47,527	209	251	220
Colorado				42		42			151,702	7,536	159,238	21	120	6	126	19,372	942	20,314	161	157	161
Missouri				2	2	4			110,728	140,865	251,593	7	52	63	115	13,519	17,160	30,679	260	272	267
New York				1	1	2			43,000	40,080	83,080	3	26	18	44	5,200	4,620	9,820	200	257	223
Ohio				26	30	56			657,941	1,237,730	1,895,671	26	406	635	1,041	81,358	150,963	232,321	200	238	223
Pennsylvania				20	2	22			638,188	119,645	757,833	31	393	83	476	77,361	14,640	92,001	197	176	193
South Dakota				4		4			197,332	26,027	223,359	3	81	11	92	22,404	3,042	25,446	277	277	277
Tennessee				45	7	52			568,400	84,240	652,640	4	303	42	345	70,645	10,530	81,175	233	251	235
Virginia				4		4			132,993	18,096	151,089	5	62	8	70	14,020	1,924	15,944	226	241	228
Washington				1	1	2			26,928	58,520	85,448	3	15	32	47	3,366	7,315	10,681	224	229	227
West Virginia				7	5	12			356,735	276,919	633,654	4	192	135	327	44,592	34,615	79,207	232	256	242
Wisconsin				10		10			180,393	20,091	200,484	12	111	13	124	22,356	2,470	24,826	201	190	200
Other States[2]				10	18	28			274,396	325,856	600,252	38	184	169	353	33,617	39,101	72,718	183	231	206
Total				190	72	262			3,785,468	2,497,888	6,283,356	177	2,187	1,284	3,471	463,145	305,107	768,252	212	238	221

[1] Includes a small number of mills or other plants not operated in connection with quarries.

[2] Includes Alabama, Illinois, Indiana, Kansas, Massachusetts, Michigan, Minnesota, Montana, Nebraska, Nevada, New Jersey, New Mexico, North Carolina, Oregon, Utah, and Wyoming.

TABLE 18.—*Injury and employment data on slate operations, by States, 1954*

State	Fatal injuries			Nonfatal injuries			Widows	Orphans	Man-hours worked			Number of operations[1]	Men at work			Man-days worked			Average days active		
	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total			Quarry and mine	Processing works	Total		Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total
New York				18	1	19			237,872	66,494	304,366	7	104	34	138	29,734	7,548	37,282	286	222	270
Pennsylvania				64	16	80			598,038	878,055	1,476,093	17	292	384	676	75,320	107,828	183,148	258	281	271
Vermont				29	4	33			477,133	287,656	764,789	17	229	101	330	59,552	30,182	89,734	260	299	272
Virginia				28		28			116,801	252,733	369,534	5	56	122	178	13,309	29,193	42,502	238	239	239
Other States[2]				11	10	21			132,612	228,880	361,492	8	68	116	184	15,748	24,856	40,604	232	214	221
Total				150	31	181			1,562,456	1,713,818	3,276,274	54	749	757	1,506	193,663	199,607	393,270	259	264	261

[1] Includes a small number of mills or other plants not operated in connection with quarries.
[2] Includes Arkansas, California, Georgia, Maine, and Maryland.

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TABLE 19.—*Injury and employment data on traprock operations, by States, 1954*

State	Fatal injuries			Nonfatal injuries			Widows	Orphans	Man-hours worked			Number of operations[1]	Men at work			Man-days worked			Average days active		
	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total			Quarry and mine	Processing works	Total		Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total
California				8	4	12			269,070	118,706	387,776	13	148	91	239	33,557	14,666	48,223	227	161	202
Connecticut	1		1	11	4	15			352,361	176,021	528,382	13	154	76	230	40,866	19,895	60,761	265	262	264
Idaho									86,127	15,220	101,347	5	69	7	76	9,775	1,880	11,655	142	269	153
Maryland				6		6			161,381	13,732	175,113	3	65	6	71	17,590	1,512	19,102	271	252	269
Massachusetts				29	8	37			626,163	223,029	849,192	14	286	103	389	73,641	27,299	100,940	257	265	259
New Jersey	1		1	61	25	86	1		1,219,144	454,248	1,673,392	15	476	189	665	135,060	49,601	184,661	284	262	278
New York				11	4	15			216,951	111,993	328,944	3	117	68	185	26,770	13,824	40,594	229	203	219
North Carolina				5		5			63,278	51,218	114,496	3	32	25	57	7,436	6,034	13,470	232	241	236
Oregon				4		4			130,740	54,480	185,220	24	128	50	178	16,342	6,810	23,152	128	136	130
Pennsylvania				27	2	29			669,531	128,742	798,273	14	313	62	375	79,228	15,774	95,002	253	254	253
Virginia				19		19			146,280	36,312	182,592	4	67	17	84	17,020	4,188	21,208	254	246	252
Washington				14		14			218,193	42,233	260,426	30	221	52	273	26,882	5,201	32,083	122	100	118
Other States[2]				2	4	6			82,434	146,500	228,934	6	50	85	135	10,304	18,313	28,617	206	215	212
Total	2		2	197	51	248	1		4,241,653	1,572,434	5,814,087	147	2,126	831	2,957	494,471	184,997	679,468	233	223	230

[1] Includes a small number of mills or other plants not operated in connection with quarries.

[2] Includes Montana, Nevada, Texas, and Wisconsin.

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SELECTED INJURY DATA

TABLE 20.—*Injuries at cement mills (including crusher and auxiliary works), by agency and degree of injury, 1954*

Degree of injury	Haulage	Machinery	Handtools	Stepping on nail	Electricity	Falls of persons	Falling objects (rocks, timbers, etc.)	Flying objects	Handling materials	Burns	Other causes	Total
Fatal	1					3	1					5
Permanent total						1						1
Permanent partial	2	16				3	1		1	2	5	30
Temporary total	8	22	10	1	2	45	13	7	29	16	74	227
Total nonfatal	10	38	10	1	2	49	14	7	30	18	79	258

TABLE 21.—*Injury and employment data on work* **inside** *cement quarries and mines,*[1] *granite quarries and mines, limestone quarries and mines, limestone quarries and mines (chief product, lime), marble quarries and mines, sandstone quarries and mines, slate quarries and mines, and traprock quarries and mines, by employment groups, 1954*

CEMENT QUARRIES AND MINES

Size of groups inside quarry or mine	Number of plants	Men at work	Man-days worked	Man-hours worked	Number of injuries		Frequency rates per million man-hours
					Fatal	Nonfatal	
1 to 4	9	21	5,549	44,403		1	22.52
5 to 9	18	126	30,648	245,262		3	12.23
10 to 24	73	1,258	340,067	2,728,796		18	6.60
25 to 49	39	1,324	358,169	2,882,540		20	6.94
50 to 99	9	581	156,530	1,252,282		9	7.19
100 to 149	2	215	59,040	472,323	1	4	10.59
Total	150	3,525	950,003	7,625,606	1	55	7.34

GRANITE QUARRIES AND MINES

1 to 4	57	150	27,974	227,225	1	11	52.81
5 to 9	56	374	83,607	690,184		62	89.83
10 to 24	49	680	153,682	1,270,674	1	66	52.73
25 to 49	23	777	199,976	1,715,546	1	49	29.15
50 to 99	7	423	102,711	847,518		21	24.78
100 to 149	3	375	93,574	748,592	1	22	30.72
Total	195	2,779	661,524	5,499,739	4	231	42.73

LIMESTONE QUARRIES AND MINES

1 to 4	336	871	163,739	1,371,542		56	40.83
5 to 9	509	2,903	603,662	5,202,724	4	239	46.71
10 to 24	298	4,210	961,168	8,173,182	2	367	45.15
25 to 49	85	2,548	620,172	5,149,302		182	35.34
50 to 99	45	2,073	536,438	4,553,640		133	29.21
100 to 149	8	981	243,238	1,884,336		28	14.86
150 to 199	1	173	28,747	229,979		1	4.35
200 to 299	3	715	177,365	1,418,925		3	2.11
Total	1,285	14,474	3,334,529	27,983,630	6	1,009	36.27

See footnote at end of table.

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TABLE 21.—*Injury and employment data on work inside cement quarries and mines,*[1] *granite quarries and mines, limestone quarries and mines, limestone quarries and mines (chief product, lime), marble quarries and mines, sandstone quarries and mines, slate quarries and mines, and traprock quarries and mines, by employment groups, 1954*—Continued

LIMESTONE QUARRIES AND MINES (CHIEF PRODUCT, LIME)

Size of groups inside quarry or mine	Number of plants	Men at work	Man-days worked	Man-hours worked	Number of injuries		Frequency rates per million man-hours
					Fatal	Nonfatal	
1 to 4	18	47	11,770	96,112	----------	4	41.62
5 to 9	30	203	50,247	408,821	1	26	66.04
10 to 24	39	619	171,959	1,385,578	7	69	54.85
25 to 49	17	580	149,721	1,154,755	----------	27	23.38
50 to 99	3	234	66,034	528,278	1	17	34.07
100 to 149	4	318	90,951	727,615	----------	8	10.99
Total	111	2,001	540,682	4,301,159	9	151	37.20

MARBLE QUARRIES AND MINES

1 to 4	12	30	3,824	28,661	----------	1	34.89
5 to 9	13	82	17,286	141,444	----------	5	35.35
10 to 24	12	202	49,978	419,806	----------	18	42.88
25 to 49	11	344	77,496	656,015	----------	35	53.35
50 to 99	2	162	41,616	332,928	----------	13	39.05
Total	50	820	190,200	1,578,854	----------	72	45.60

SANDSTONE QUARRIES AND MINES

1 to 4	75	183	31,237	248,474	----------	8	32.20
5 to 9	52	330	62,353	521,091	----------	30	57.57
10 to 24	32	485	106,092	870,013	----------	71	81.61
25 to 49	11	393	78,489	656,090	----------	15	22.86
50 to 99	3	172	43,167	345,339	----------	20	57.91
100 to 149	2	261	60,545	492,360	----------	31	62.96
Total	175	1,824	381,883	3,133,367	----------	175	55.85

SLATE QUARRIES AND MINES

1 to 4	12	29	5,967	48,101	----------	6	124.74
5 to 9	14	92	21,880	181,414	----------	14	77.17
10 to 24	19	277	71,179	578,699	----------	59	101.95
25 to 49	4	125	35,923	287,387	----------	18	62.63
Total	49	523	134,949	1,095,601	----------	97	88.54

TRAPROCK QUARRIES AND MINES

1 to 4	42	122	18,414	149,470	----------	8	53.52
5 to 9	46	290	61,130	512,129	----------	10	19.53
10 to 24	45	625	133,426	1,114,393	2	58	53.84
25 to 49	8	263	63,504	585,071	----------	27	46.15
50 to 99	4	255	68,908	612,707	----------	21	34.27
Total	145	1,555	345,382	2,973,770	2	124	42.37

[1] Includes limestone or other stone used in the manufacture of cement.

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TABLE 22.—*Injury and employment data on work* **inside** *all quarries and mines, grouped by number of men working* **inside** *quarries or mines, 1954*

Size of group inside quarry or mine	Number of plants	Men at work	Man-days worked	Man-hours worked	Number of injuries		Frequency rate per million man-hours
					Fatal	Nonfatal	
1 to 4	561	1,453	268,474	2,213,988	1	95	43.36
5 to 9	738	4,400	930,813	7,903,069	5	389	49.85
10 to 24	567	8,356	1,987,551	16,541,141	12	726	44.62
25 to 49	198	6,354	1,583,450	13,086,706	1	373	28.58
50 to 99	73	3,900	1,015,404	8,472,692	1	234	27.74
100 to 149	19	2,150	547,348	4,325,226	2	93	21.96
150 to 199	1	173	28,747	229,979	----------	1	4.35
200 to 299	3	715	177,365	1,418,925	----------	3	2.11
Total	2,160	27,501	6,539,152	54,191,726	22	1,914	35.73

COMPARATIVE SEVERITY OF INJURIES

Injuries in the rock quarrying and its related plants are divided into four classes according to their degree of severity: Fatal, permanent total, permanent partial, and temporary total. A typical ratio of the frequency of injuries per million man-hours among the 4 types may best be indicated by combining the number of injuries for a period of years, as the number of injuries in a single year falling into any one of the first 3 classes may be small. Therefore, a 5-year period has been used as a basis for table 24. From 1950 to 1954, 22,756 injuries were reported. For each fatality, the relative number of other classes of injuries was 0.12 for permanent total disabilities, 2.9 for permanent partial disabilities, and 82.9 for temporary lost-time injuries. From each 1,000 accidents, 12 resulted in fatalities, 1 in a permanent total disability, 33 in permanent partial disabilities, and 954 in temporary disabilities from which the worker recovered and was able to return to duty. This distribution of accidents during the past 5 years is fairly typical as it does not differ materially from injuries covering previous 5-year periods.

TABLE 23.—*Injury and employment data on work* **inside** *stone quarries and mines, by kind of stone and length of shift, 1954*

Kind of stone and length of shift	Number of operations	Men at work	Man-days worked	Man-hours worked	Number of injuries		Frequency rate per million man-hours	
					Fatal	Nonfatal	Fatal	Nonfatal
Cement rock:[1]								
7 hours	1	17	5,066	35,649	----------	----------	----------	----------
8 hours	144	3,384	916,847	7,335,353	1	50	0.14	6.82
9 hours	4	98	25,178	225,484	----------	5	----------	22.17
All other and not stated[2]	1	26	2,912	29,120	----------	----------	----------	----------
Total	150	3,525	950,003	7,625,606	1	55	.13	7.21
Granite:								
8 hours	155	2,113	490,335	3,921,449	3	165	.77	42.08
9 hours	33	514	130,856	1,174,858	1	50	.85	42.56
All other and not stated[2 3]	7	152	40,333	403,432	----------	16	----------	39.66
Total	195	2,779	661,524	5,499,739	4	231	.73	42.00

See footnotes at end of table.

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TABLE 23.—*Injury and employment data on work* **inside** *stone quarries and mines, by kind of stone and length of shift, 1954*—Continued

Kind of stone and length of shift	Number of operations	Men at work	Man-days worked	Man-hours worked	Number of injuries		Frequency rate per million man-hours	
					Fatal	Nonfatal	Fatal	Nonfatal
Limestone:								
6 hours	4	20	4,248	25,782				
7 hours	12	128	28,108	200,153		4		19.98
8 hours	716	9,605	2,225,955	17,873,797	2	526	0.11	29.43
9 hours	285	3,126	755,020	6,781,399	3	344	.44	50.73
All other and not stated	268	1,595	321,198	3,102,499	1	135	.32	43.51
Total	1,285	14,474	3,334,529	27,983,630	6	1,009	.21	36.06
Lime:								
7 hours	5	79	20,970	145,984		5		34.25
8 hours	95	1,769	483,713	3,867,412	9	138	2.33	35.68
9 hours	8	110	23,351	210,783		3		14.23
All other and not stated [2]	3	43	12,648	76,980		5		64.95
Total	111	2,001	540,682	4,301,159	9	151	2.09	35.11
Marble:								
6 hours	2	6	966	5,796				
7 hours	1	31	8,060	59,783		6		100.36
8 hours	37	546	125,654	1,005,231		49		48.75
9 hours	8	208	47,980	432,644		14		32.36
All other and not stated	2	29	7,540	75,400		3		39.79
Total	50	820	190,200	1,578,854		72		45.60
Sandstone:								
6 hours	1	3	495	2,970				
7 hours	2	20	3,770	25,960		11		423.73
8 hours	142	1,445	308,281	2,474,580		144		58.19
9 hours	23	259	52,602	463,275		17		36.70
All other and not stated	7	97	16,735	166,582		3		18.01
Total	175	1,824	381,883	3,133,367		175		55.85
Slate:								
7 hours	1	23	5,359	38,062		6		157.64
8 hours	39	410	107,923	862,089		67		77.72
9 hours	5	63	16,294	141,720		23		162.29
All other and not stated [3]	4	27	5,373	53,730		1		18.61
Total	49	523	134,949	1,095,601		97		88.54
Traprock:								
6 hours	1	10	3,100	19,830				
8 hours	102	898	176,791	1,416,202	1	59	.71	41.66
9 hours	32	442	114,395	1,027,836	1	45	.97	43.78
All other and not stated [4]	10	205	51,096	509,902		20		39.22
Total	145	1,555	345,382	2,973,770	2	124	.67	41.70

[1] Includes limestone and other stone used in the manufacture of cement.
[2] No quarries reported for the 6-hour group.
[3] No quarries reported for the 7-hour group.

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TABLE 24.—*Number of injuries and injury rates per million man-hours at all stone quarries and mines, by 5-year periods, 1940–54*

Degree of injury	Total 1940–44	Total 1945–49	1950	1951	1952	1953	1954	Total 1950–54
Fatal	413	324	54	57	74	43	34	262
Permanent total [1]	31	29	7	6	3	8	7	31
Permanent partial [2]	741	751	165	163	149	139	136	752
Temporary total [3]	27, 271	23, 802	4, 590	4, 776	4, 351	4, 303	3, 691	21, 711
Total	28, 456	24, 906	4, 816	5, 002	4, 577	4, 493	3, 868	22, 756
INJURY FREQUENCY PER MILLION MAN-HOURS								
Fatal	0. 525	0. 395	0. 285	0. 298	0. 397	0. 227	0. 193	0. 281
Permanent total [1]	. 039	. 035	. 037	. 031	. 016	. 042	. 040	. 033
Permanent partial [2]	. 942	. 916	. 871	. 853	. 799	. 732	. 774	. 806
Temporary total [3]	34. 703	29. 060	24. 217	24. 990	23. 323	22. 674	20. 993	23. 275
Total	36. 211	30. 409	25. 410	26. 173	24. 535	23. 675	22. 000	24. 396
Number of employees per year	75, 651	72, 649	85, 730	84, 802	81, 879	83, 641	78, 910	82, 992

[1] Permanent total disability: The loss of, or loss of use of, both hands, or both arms, or both legs, or both feet, or both eyes, or any 2 thereof; or any injury (except death) that permanently and totally incapacitates the injured person from following any gainful occupation.

[2] Permanent partial disability: Loss of, or loss of use of, 1 foot, leg, hand, arm, or eye; or loss of part of bone of 1 of the foregoing; or loss of, or loss of use of 1 or more fingers, or 1 great toe, or any 2 or more toes; or the permanent impairment of use of any part of the body.

[3] Disability for more than the remainder of day of accident.

DIMENSION-STONE AND NON-DIMENSION-STONE QUARRIES

Reports from operators of stone quarries and mines submitted to the Bureau of Mines in response to its survey state the use for which the stone is produced. With this information as a basis, the reports are classified by the Bureau into three groups: (1) Nondimension stone, which is used for the manufacture of cement and lime, for agricultural purposes, road building, or for other purposes where stone is needed in a crushed or irregular form; (2) dimension stone, which includes all stone cut or shaped for building purposes and for monuments; (3) all other and not stated includes the stone that the reports do not classify as having any definite use.

Eighty-four percent of the men employed in the quarrying industry worked at plants producing nondimension stone. Twelve percent of the employees worked in the dimension-stone plants. Only 4 percent of the men worked in plants that failed to state the use for which the stone was being quarried.

The non-dimension-stone quarry group shows a decided improvement in the safety record for 1954 and, as usual, maintains a much better record than the dimension-stone group, principally owing to the fact that the cement industry, which consistently maintains a low injury-frequency rate, had an outstanding record for 1954. The overall-injury-frequency rate for the non-dimension-stone quarries and plants was 18.64 in 1954, while the rate in 1953 was 20.67 per million man-hours of work. The principal causes of injuries at non-dimension-stone quarries were falls of persons, machinery, handling materials, and haulage; while machinery, handling materials, and falls of persons were the leading causes of the injuries at the mills and plants.

At quarries producing dimension stone, the combined injury rate was 45.25 in 1954, while the rate was 43.74 in 1953. Although more men worked at dimension-stone quarries in 1954 than in 1953, the number of man-hours worked declined because of a decrease in the number of working days during the year. Most of the injuries to workers in the quarry were caused by handling materials, flying objects, and falls of persons, while in the sawing and finishing plants handling material and machinery were the main causes of injuries. At "all other" quarries the greatest number of injuries resulted while handling materials.

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TABLE 25.—*Dimension-stone and non-dimension-stone quarries and mines: Injuries, injury rates, and employment data, by kind of stone and place, 1954*

Kind of stone	Fatal injuries						Nonfatal injuries						Man-hours worked			Men at work			Man-days worked			Average days active		
	Quarry and mine		Processing works		Total		Quarry and mine		Processing works		Total													
	Number	Per million man-hours	Number	Per million man-hours	Number	Per million man-hours	Number	Per million man-hours	Number	Per million man-hours	Number	Per million man-hours	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total	Quarry and mine	Processing works	Total
Dimension stone:																								
Granite	3	1.19	----	----	3	0.62	155	61.73	94	40.89	249	51.77	2,511,046	2,298,847	4,809,893	1,311	1,190	2,501	312,240	283,474	595,714	238	238	238
Limestone	----	----	----	----	----	----	76	39.10	95	33.47	171	35.76	1,943,613	2,838,352	4,781,965	1,004	1,381	2,385	240,497	348,471	588,968	240	252	247
Marble	----	----	----	----	----	----	52	41.48	46	19.90	98	27.49	1,253,498	2,311,982	3,565,480	678	1,130	1,808	151,546	287,517	439,063	224	254	243
Sandstone	----	----	----	----	----	----	115	83.49	39	30.20	154	57.70	1,377,334	1,291,452	2,668,786	824	661	1,485	171,529	157,819	329,348	208	239	222
Slate	----	----	----	----	----	----	107	110.99	22	22.49	129	66.42	964,092	978,039	1,942,131	467	445	912	121,385	119,958	241,343	260	270	265
Total	3	.37	----	----	3	.17	505	62.74	296	30.46	801	45.08	8,049,583	9,718,672	17,768,255	4,284	4,807	9,091	997,197	1,197,239	2,194,436	233	249	241
Nondimension stone:																								
Cement [1]	1	.11	5	0.08	6	.08	64	7.36	258	4.14	322	4.53	8,696,184	62,361,828	71,058,012	4,006	23,712	27,718	1,083,446	7,796,358	8,879,804	270	329	320
Granite	1	.26	----	----	1	.19	107	27.77	26	16.83	133	24.64	3,853,249	1,545,034	5,398,283	1,819	754	2,573	451,072	181,086	632,158	248	240	246
Limestone	9	.26	3	.25	12	.26	1,216	35.20	292	24.80	1,508	32.55	34,546,466	11,775,711	46,322,177	17,206	5,739	22,945	4,103,813	1,393,229	5,497,042	239	243	240
Limestone (chief product, lime)	9	1.61	1	.08	10	.53	220	39.45	237	17.91	457	24.30	5,576,707	13,232,424	18,809,131	2,570	5,415	7,985	699,534	1,645,608	2,345,142	272	304	294
Marble	----	----	----	----	----	----	5	26.21	8	55.35	13	38.77	190,733	144,539	335,272	99	81	180	23,841	18,030	41,871	241	223	233
Sandstone	----	----	----	----	----	----	68	33.34	30	31.18	98	32.65	2,039,789	962,055	3,001,844	1,129	503	1,632	246,262	117,266	363,528	218	233	223
Slate	----	----	----	----	----	----	23	58.78	9	14.07	32	31.04	391,272	639,729	1,031,001	173	262	435	46,455	68,349	114,804	269	261	264
Traprock	2	.52	----	----	2	.38	182	46.88	44	31.71	226	42.89	3,882,116	1,387,663	5,269,779	1,859	735	2,594	450,851	161,700	612,551	243	220	236
Total	22	.37	9	.10	31	.20	1,885	31.85	904	9.82	2,789	18.44	59,176,516	92,048,983	151,225,499	28,861	37,201	66,062	7,105,274	11,381,626	18,486,900	246	306	280
All other and not stated:																								
Granite	----	----	----	----	----	----	23	37.62	52	23.65	75	26.69	611,379	2,199,102	2,810,481	347	1,048	1,395	75,991	267,369	343,360	219	255	246
Limestone	----	----	----	----	----	----	49	82.07	20	37.74	69	61.23	597,038	529,912	1,126,950	649	267	916	73,148	65,560	138,708	113	246	151
Marble	----	----	----	----	----	----	16	49.76	32	28.98	48	33.67	321,544	1,104,245	1,425,789	138	432	570	37,456	125,483	162,939	271	290	286
Sandstone	----	----	----	----	----	----	7	19.00	3	12.28	10	16.32	368,345	244,381	612,726	234	120	354	45,354	30,022	75,376	194	250	213
Slate	----	----	----	----	----	----	20	96.58	----	----	20	65.98	207,092	96,050	303,142	109	50	159	25,823	11,300	37,123	237	226	233
Traprock	----	----	----	----	----	----	15	41.72	7	37.88	22	40.42	359,537	184,771	544,308	267	96	363	43,620	23,297	66,917	163	243	184
Total	----	----	----	----	----	----	130	52.74	114	26.16	244	35.76	2,464,935	4,358,461	6,823,396	1,744	2,013	3,757	301,392	523,031	824,423	173	260	219
Grand total	25	.36	9	.08	34	.19	2,520	36.16	1,314	12.38	3,834	21.81	69,691,034	106,126,116	175,817,150	34,889	44,021	78,910	8,403,863	13,101,896	21,505,759	241	298	273

[1] Includes limestone or other stone used in the manufacture of cement.

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TABLE 26.—*Injury and employment data on work* **inside** *dimension-stone and non-dimension-stone quarries and mines, by employment groups, 1954*

Size groups	Number of plants	Men at work	Man-days worked	Man-hours worked	Number of injuries		Frequency rate per million man-hours	
					Fatal	Non-fatal	Fatal	Non-fatal
Dimension stone:								
1 to 4	75	198	36,406	289,229	1	12	3.46	41.49
5 to 9	63	397	82,455	679,050	----	66	----	97.19
10 to 24	55	778	184,414	1,484,896	1	134	.67	90.24
25 to 49	25	857	201,203	1,634,378	----	82	----	50.17
50 to 99	11	717	173,521	1,404,521	----	72	----	51.26
100 to 149	5	638	151,133	1,217,061	1	59	.82	48.48
Total	234	3,585	829,132	6,709,135	3	425	.45	63.35
Nondimension stone:								
1 to 4	427	1,115	214,458	1,783,917	----	79	----	44.28
5 to 9	628	3,687	802,548	6,848,540	5	309	.73	45.12
10 to 24	473	7,039	1,732,220	14,470,813	11	556	.76	38.42
25 to 49	164	5,231	1,323,751	10,979,007	1	261	.09	23.77
50 to 99	59	2,979	791,801	6,654,750	1	132	.15	19.84
100 to 149	14	1,512	396,215	3,108,165	1	34	.32	10.94
150 to 199	1	173	28,747	229,979	----	1	----	4.35
200 to 299	3	715	177,365	1,418,925	----	3	----	2.11
Total	1,769	22,451	5,467,105	45,494,096	19	1,375	.42	30.22
All other and not stated:								
1 to 4	59	140	17,610	140,842	----	4	----	28.40
5 to 9	47	316	45,810	375,479	----	14	----	37.29
10 to 24	39	539	70,917	585,432	----	36	----	61.49
25 to 49	9	266	58,496	473,321	----	30	----	63.38
50 to 99	3	204	50,082	413,421	----	30	----	72.57
Total	157	1,465	242,915	1,988,495	----	114	----	57.33

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TABLE 27.—*Dimension-stone and non-dimension-stone quarries and mines: Number of injuries, by kind of stone, agency, and degree of injury, 1954*

(No injuries occurred in stones not listed)

Kind of stone	Open quarry																Underground mines																
	In quarry																Underground																
	Falls or slides of rock or overburden	Handling materials	Handtools	Explosives	Haulage	Falls of persons	Falling objects (other than 1 and 2)	Flying objects	Electricity	Drilling and channeling (by machine and hand)	Machinery	Stepping on nail	Boiler and air-tank explosions	Burns	Other causes	Surface	Total	Falls of rock from roof	Handling rock while loading at working face or chute	Handtools	Explosives	Haulage	Falling down chute, winze, raise, or stope	Run of rock from chute or pocket	Drilling	Electricity	Machinery (other than locomotive or drills)	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling materials (other than rock)	Other causes
Dimension stone:																																	
Fatal:																																	
Granite					1	1		1									3																
Total					1	1		1									3																
Permanent total:[1]																																	
Granite								1									1																
Total								1									1																
Permanent partial:[2]																																	
Granite	1										1						2																
Limestone						1					3						4																
Marble										1							1																
Sandstone						1											1																
Slate																2	2																
Total	1					2				1	4					2	10																
Temporary:[3]																																	
Granite	3	27	8		3	21	6	11		8	9	1		2	23	30	152															
Limestone	1	10	3			11	6	17		8	4	1			6	5	72																
Marble	2	6	4		1	5	5	5		5	3			1	7		44		1	2												3	
Sandstone	7	67	10		3	6	1	5		3	4			1	2	5	114															
Slate	14	20	2			2	2	9		4	1	1			6	37	98	1	1			3			1								1
Total	27	130	27		7	45	20	47		28	21	3		4	44	77	480	1	2	2		3			1							3	1
Nondimension stone:																																	
Fatal:																																	
Cement[4]																		1															
Granite	1																1																
Limestone		1			1	2	1									3	8			1													
Limestone (chief product, lime)	2			2	1								4				9																
Sandstone																																	
Traprock							1				1						2																
Total	3	1		2	2	2	2				1		4			3	20	1		1													
Permanent total:[1]																																	
Cement[4]																																	
Limestone					1			1									2																
Limestone (chief product, lime)																																	
Sandstone	1																1																
Total	1				1			1									3																

See footnotes at end of table.

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TABLE 27.—*Dimension-stone and non-dimension-stone quarries and mines: Number of injuries, by kind of stone, agency, and degree of injury, 1954*—Continued

(No injuries occurred in stones not listed)

Kind of stone	Open quarry: In quarry: Falls or slides of rock or overburden	Handling materials	Handtools	Explosives	Haulage	Falls of persons	Falling objects (other than 1 and 2)	Flying objects	Electricity	Drilling and channeling (by machine and hand)	Machinery	Stepping on nail	Boiler and air-tank explosions	Burns	Other causes	Open quarry: Surface	Total	Underground mines: Underground: Falls of rock from roof	Handling rock while loading at working face or chute	Handtools	Explosives	Haulage	Falling down chute, winze, raise, or slope	Run of rock from chute or pocket	Drilling	Electricity	Machinery (other than locomotive or drills)	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling materials (other than rock)	Other causes
Nondimension stone–Continued																																	
Permanent partial: [3]																																	
Cement [4]					1	1				1							3																
Granite											2					3	5																
Limestone	2	1	1		2	5		2			9				1	12	35			1		1			1							
Limestone (chief product, lime)								2			1					4	7						1		1		1					
Sandstone	1						1										2															
Traprock															1	1	2															
Total	3	1	1		3	6	1	4		1	12				2	20	54			1		1	1		2		1					
Temporary: [3]																																	
Cement [4]	7	5	1	1	3	8	2	1	1	8	4				8	9	58	1				1											1
Granite	5	13	8	1	10	11	4	2	3	8	10	1			9	17	102																
Limestone	30	77	47	19	102	108	21	57	4	58	91	28	1	14	108	295	1,060	10	8	11	3	4	5	1	18		7				2	6	21
Limestone (chief product, lime)	8	20	3	5	13	10	4	8	1	9	15	1		3	14	65	179	2	3	3	2	1	2		14		2					2	
Marble		1	2		1										1		5																
Sandstone	7	13	2	1	4	6	2	3		1	8	1		2	4	9	63	1		1													
Slate		4	3		2						1				1	12	23																
Traprock	7	19	10		12	11		8		9	13	6		1	19	65	180																
Total	64	152	76	27	147	154	33	79	9	93	142	37	1	20	164	472	1,670	14	11	15	5	6	7	1	32		9				2	8	22
All other and not stated:																																	
Permanent partial: [3]																																	
Granite																																	
Limestone		1															1																
Marble																																	
Slate	1																1																
Traprock																																	
Total	1	1															2																
Temporary: [3]																																	
Granite		6				2		5		2	3				1	4	23																
Limestone		29	3	1	3	2	2	2			2			1		2	47		1														
Marble	1	3			1	1				2	3				4		15								1								
Sandstone		3					1	1								1	6			1													
Slate	3	2	2									1			9	2	19																
Traprock	2		2							1					3	7	15																
Total	6	43	7	1	4	5	3	8		5	8	1		1	17	16	125		1	1					1								
All quarries:																																	
Fatal	3	1		2	3	3	2	1			1		4			3	23	1		1													
Permanent total [1]	1				1			2									4																
Permanent partial [2]	5	2	1		3	8	1	4		2	16				2	22	66			1		1	1		2		1					
Temporary total [3]	97	325	110	28	158	204	56	134	9	126	171	41	1	25	225	565	2,275	15	14	18	5	9	7	1	34		9				2	11	23
Total nonfatal	103	327	111	28	162	212	57	140	9	128	187	41	1	25	227	587	2,345	15	14	19	5	10	8	1	36		10				2	11	23

See footnotes at end of table.

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Kind of stone	Underground mines—Continued								Processing works													Grand total
	Shaft or slope						Surface	Total	Crusher and mill													
	Falling down shaft or slope	Objects falling down shaft or slope	Breaking of cables	Overwinding	Cage, skip, or bucket	Other causes			Haulage	Machinery	Handtools	Stepping on nail or sharp object	Electricity	Falls of persons	Falling objects	Flying objects	Handling materials	Burns	Other causes	Auxiliary work	Total	
Dimension stone:																						
Fatal:																						
Granite																						3
Total																						3
Permanent total: [1]																						
Granite																						1
Total																						1
Permanent partial: [2]																						
Granite															1						1	3
Limestone										3					1					1	5	9
Marble																						1
Sandstone																				2	2	3
Slate																						2
Total										3					2					3	8	18
Temporary: [3]																						
Granite									8	12	12	1	1	13	4	5	19	1	9	8	93	245
Limestone									2	19	4	1		7	8	7	29		4	9	90	162
Marble							1	7		2					5		5	3	16	15	46	97
Sandstone										2	1			3	3	2	2		3	21	37	151
Slate								7		2	7						8		2	3	22	127
Total							1	14	10	37	24	2	1	23	20	14	63	4	34	56	288	782
Nondimension stone:																						
Fatal:																						
Cement [4]								1						1						4	5	6
Granite																						1
Limestone								1	1	1	1										3	12
Limestone (chief product, lime)										1											1	10
Sandstone																						
Traprock																						2
Total								2	1	2	1			1						4	9	31
Permanent total: [1]																						
Cement [4]																				1	1	1
Limestone										1											1	3
Limestone (chief product, lime)																			1		1	1
Sandstone																						1
Total										1									1	1	3	6

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TABLE 27.—*Dimension-stone and non-dimension-stone quarries and mines: Number of injuries, by kind of stone, agency, and degree of injury, 1954*—Continued

(No injuries occurred in stones not listed)

Kind of stone	Underground mines—Continued								Processing works													Grand total
	Shaft or slope								Crusher and mill													
	Falling down shaft or slope	Objects falling down shaft or slope	Breaking of cables	Overwinding	Cage, skip, or bucket	Other causes	Surface	Total	Haulage	Machinery	Handtools	Stepping on nail or sharp object	Electricity	Falls of persons	Falling objects	Flying objects	Handling materials	Burns	Other causes	Auxiliary works	Total	
Nondimension stone—Continued																						
Permanent partial:[2]																						
Cement[4]									1	10				3	1		1	2	1	11	30	33
Granite										1											1	6
Limestone								3	1	7	1					2	1		1	1	14	52
Limestone (chief product, lime)								3		1	1			1						1	4	14
Sandstone										1											1	3
Traprock									1	1											2	4
Total								6	3	21	2			4	1	2	2	2	2	13	52	112
Temporary:[3]																						
Cement[4]								3	5	17	4		1	34	9	7	17	16	56	61	227	288
Granite									2	4	1	1		5		1	5		6		25	127
Limestone		2					18	116	31	60	18	5		29	21	13	35	8	52	5	277	1,453
Limestone (chief product, lime)								31	9	15	13	3	1	22	13	11	36	23	23	63	232	442
Marble										2					1		1			4	8	13
Sandstone								2	3	5	1			1	1	3	1			14	29	94
Slate										2		1						1		5	9	32
Traprock									1	5	3	1		7	1	5	9	1	5	4	42	222
Total		2					18	152	51	110	40	11	2	98	46	40	104	49	142	156	849	2,671
All other and not stated:																						
Permanent partial:[2]																						
Granite										1							1				2	2
Limestone																						1
Marble														1							1	1
Slate																						1
Traprock										1											1	1
Total										2				1			1				4	6
Temporary:[3]																						
Granite										3	6		2	5	5	8	11	2	1	7	50	73
Limestone								1		3				11	2		3		1		20	68
Marble								1		1	1			1	1	1	1		2	23	31	47
Sandstone								1											1	2	3	10
Slate																						19
Traprock														1	1	2			1	1	6	21
Total								3		7	7		2	18	9	11	15	2	6	33	110	238
All quarries:																						
Fatal								2	1	2	1			1						4	9	34
Permanent total[1]										1									1	1	3	7
Permanent partial[2]								6	3	26	2			5	3	2	3	2	2	16	64	136
Temporary total[3]		2					19	169	61	154	71	13	5	139	75	65	182	55	182	245	1,247	3,691
Total nonfatal		2					19	175	64	181	73	13	5	144	78	67	185	57	185	262	1,314	3,834

[1] Permanent total disability: The loss of, or loss of use of, both hands, or both arms, or both legs, or both feet, or both eyes, or any 2 thereof, or any injury (except death) that permanently and totally incapacitates the injured person from following any gainful occupation.

[2] Permanent partial disability: Loss of, or loss of use of, 1 foot, leg, hand, arm, or eye; or loss of part of bone of 1 of the foregoing; or loss of, or loss of use of, 1 or more fingers, or 1 great toe, or any 2 or more toes; or permanent impairment of use of any part of the body.

[3] Disability for more than the remainder of the day of the accident.

[4] Includes limestone or other stone used in the manufacture of cement.

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TABLE 28.—*Dimension-stone and non-dimension-stone quarries and mines: Injuries, injury rates per million man-hours, and employment data, by States, 1954*

State	Dimension stone						
	Men at work	Man-days worked	Man-hours worked	Number of injuries		Injury rates	
				Fatal	Nonfatal	Fatal	Nonfatal
Alabama							
Arizona							
Arkansas	(1)	(1)	(1)	(1)	(1)	(1)	(1)
California	71	16, 720	138, 910		4		28. 80
Colorado	118	19, 612	151, 632	1	42	6. 59	276. 99
Connecticut	26	6, 495	51, 669		1		
Delaware							
Florida	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Georgia	867	212, 428	1, 701, 204	1	59	. 59	34. 68
Idaho							
Illinois							
Indiana	2, 052	498, 691	4, 051, 137		135		33. 32
Iowa							
Kansas	71	20, 370	162, 960		6		36. 82
Kentucky							
Louisiana							
Maine	241	48, 203	398, 795		31		77. 73
Maryland							
Massachusetts	97	23, 403	187, 226		27		144. 21
Michigan							
Minnesota	578	144, 301	1, 195, 854		66		55. 19
Mississippi							
Missouri	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Montana							
Nebraska	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Nevada	(1)	(1)	(1)	(1)	(1)	(1)	(1)
New Hampshire	(1)	(1)	(1)	(1)	(1)	(1)	(1)
New Jersey							
New Mexico							
New York	76	20, 859	171, 392		11		64. 18
North Carolina	157	38, 313	306, 500		9		29. 36
Ohio	903	203, 395	1, 656, 678		55		33. 20
Oklahoma	54	13, 854	114, 707		11		95. 90
Oregon							
Pennsylvania	631	169, 513	1, 343, 185		81		60. 30
Rhode Island	(1)	(1)	(1)	(1)	(1)	(1)	(1)
South Carolina							
South Dakota	169	38, 191	309, 541		20		64. 61
Tennessee	970	220, 719	1, 819, 345		84		46. 17
Texas	160	43, 780	350, 241		26		74. 23
Utah	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Vermont	1, 331	330, 635	2, 649, 682	1	86	. 38	32. 46
Virginia	88	22, 728	192, 988		19		98. 45
Washington	47	9, 924	79, 389		2		25. 19
West Virginia	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Wisconsin	282	70, 050	560, 063		18		32. 14
Wyoming							
Other States	102	22, 252	175, 157		8		45. 67
Total	9, 091	2, 194, 436	17, 768, 255	3	801	. 17	45. 08

See footnote at end of table.

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TABLE 28.—*Dimension-stone and non-dimension-stone quarries and mines: Injuries, injury rates per million man-hours, and employment data, by States, 1954*—Continued

State	Nondimension stone						
	Men at work	Man-days worked	Man-hours worked	Number of injuries		Injury rates	
				Fatal	Nonfatal	Fatal	Nonfatal
Alabama	2,099	605,848	4,861,614	-------	70	-------	14.40
Arizona	299	90,149	721,189	1	25	1.39	34.66
Arkansas	316	106,584	852,685	-------	23	-------	26.97
California	4,203	1,236,314	9,913,120	-------	133	-------	13.42
Colorado	504	136,296	1,094,771	-------	13	-------	11.87
Connecticut	294	78,613	673,767	1	21	1.48	31.17
Delaware	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Florida	1,511	423,885	3,650,704	-------	126	-------	34.51
Georgia	1,315	367,704	3,110,500	-------	66	-------	21.22
Idaho	112	30,574	250,832	-------	4	-------	15.95
Illinois	3,558	933,353	7,572,090	-------	122	-------	16.11
Indiana	2,152	680,949	5,532,730	1	43	.18	7.77
Iowa	2,088	571,303	4,881,257	1	79	.20	16.18
Kansas	1,540	413,880	3,391,994	-------	55	-------	16.21
Kentucky	1,596	368,858	3,083,073	2	97	.65	31.46
Louisiana	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Maine	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Maryland	973	268,607	2,205,249	-------	88	-------	39.90
Massachusetts	567	157,549	1,310,556	-------	41	-------	31.28
Michigan	3,048	957,797	7,690,078	1	60	.13	7.80
Minnesota	590	145,652	1,238,934	-------	43	-------	34.71
Mississippi	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Missouri	3,329	937,267	7,613,411	1	172	.13	22.59
Montana	239	57,053	464,337	1	7	2.15	15.08
Nebraska	715	217,541	1,750,633	-------	6	-------	3.43
Nevada	150	41,456	331,650	-------	22	-------	66.33
New Hampshire							
New Jersey	744	192,417	1,750,753	1	88	.57	50.26
New Mexico	57	9,588	76,704	-------	3	-------	39.11
New York	2,693	708,168	5,898,892	-------	118	-------	20.00
North Carolina	1,000	227,912	1,919,285	-------	31	-------	16.15
Ohio	5,455	1,639,059	13,249,087	2	225	.15	16.98
Oklahoma	1,212	341,018	2,766,098	2	49	.72	17.71
Oregon	453	125,735	1,005,881	-------	52	-------	51.70
Pennsylvania	9,507	2,672,536	21,744,526	6	266	.28	12.23
Rhode Island	(1)	(1)	(1)	(1)	(1)	(1)	(1)
South Carolina	499	131,782	1,114,960	-------	33	-------	29.60
South Dakota	458	134,649	1,126,824	-------	14	-------	12.42
Tennessee	2,430	632,079	5,191,390	3	117	.58	22.54
Texas	2,348	769,709	6,200,351	-------	89	-------	14.35
Utah	349	94,985	761,642	-------	7	-------	9.19
Vermont	256	75,369	652,794	4	26	6.13	39.83
Virginia	2,399	642,611	5,280,101	1	161	.19	30.49
Washington	963	219,655	1,754,970	-------	26	-------	14.82
West Virginia	1,444	355,909	2,883,308	3	48	1.04	16.65
Wisconsin	1,241	261,085	2,234,282	-------	95	-------	42.52
Wyoming	549	149,946	1,209,365	-------	16	-------	13.23
Other States	807	275,456	2,209,112	-------	9	-------	4.07
Total	66,062	18,486,900	151,225,499	31	2,789	.20	18.44

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TABLE 28.—*Dimension-stone and non-dimension-stone quarries and mines: Injuries, injury rates per million man-hours, and employment data, by States, 1954*—Continued

State	All other and not stated						
	Men at work	Man-days worked	Man-hours worked	Number of injuries		Injury rates	
				Fatal	Nonfatal	Fatal	Nonfatal
Alabama	369	96,491	800,046		9		11.25
Arizona	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Arkansas	(1)	(1)	(1)	(1)	(1)	(1)	(1)
California	82	12,083	101,090		1		9.89
Colorado	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Connecticut	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Delaware							
Florida							
Georgia	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Idaho	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Illinois							
Indiana							
Iowa							
Kansas	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Kentucky							
Louisiana							
Maine							
Maryland	36	8,788	72,996		3		41.10
Massachusetts	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Michigan	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Minnesota	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Mississippi							
Missouri	687	116,948	1,002,772		37		36.90
Montana	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Nebraska	52	8,087	54,692		1		18.28
Nevada	(1)	(1)	(1)	(1)	(1)	(1)	(1)
New Hampshire	(1)	(1)	(1)	(1)	(1)	(1)	(1)
New Jersey	(1)	(1)	(1)	(1)	(1)	(1)	(1)
New Mexico	(1)	(1)	(1)	(1)	(1)	(1)	(1)
New York	(1)	(1)	(1)	(1)	(1)	(1)	(1)
North Carolina	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Ohio	108	22,078	182,324				
Oklahoma							
Oregon	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Pennsylvania	86	22,691	185,659		7		37.70
Rhode Island							
South Carolina							
South Dakota							
Tennessee	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Texas	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Utah							
Vermont	88	21,241	168,731		8		47.41
Virginia	73	15,948	134,925		9		66.70
Washington	52	6,818	54,523		1		18.34
West Virginia	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Wisconsin	235	57,825	488,688		42		85.94
Wyoming	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Other States	1,889	435,425	3,576,950		126		35.23
Total	3,757	824,423	6,823,396		244		35.76

[1] Included in Other States.

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UNDERGROUND MINES

The canvass of the quarrying industry conducted by the Bureau of Mines in 1954 showed 2,252 active quarries. Of this total, 116 were underground quarries or mines. One-hundred and two of these quarries produced cement rock or limestone, and the remaining 14 produced marble, sandstone, granite, traprock, and slate. In Pennsylvania 952 men were employed daily underground and 14 mines were operated. Underground mines had an average of 3,349 men working daily, and a total of 6,624,630 man-hours was worked during the year.

The combined injury-frequency rate for all underground mines was 26.72 in 1954, an increase from the 24.47 rate in 1953. The main causes of nonfatal injuries at underground operations were drilling, handtools, and falls of rock. Two fatalities and 175 nonfatal injuries were reported during the year.

TABLE 29.—*Injury and employment data on underground stone mines, by kind of stone and State, 1954*

	Number of plants	Injuries			Men at work	Man-days worked	Man-hours worked	Average days active	Average hours worked per man per year
		Fatal	Nonfatal	Rate per million man-hours					
KIND OF STONE									
Cement [1] and limestone: [2]									
Underground and shaft	102	2	139	26.79	2,637	650,378	5,263,182	247	1,996
Surface	------	------	18	17.85	530	123,584	1,008,580	233	1,903
Total	102	2	157	25.35	3,167	773,962	6,271,762	244	1,980
Marble, sandstone, granite, and traprock:									
Underground and shaft	10	------	10	45.06	118	28,703	221,929	243	1,881
Surface	------	------	1	45.39	11	2,929	22,032	266	2,003
Total	10	------	11	45.09	129	31,632	243,961	245	1,891
Slate:									
Underground and shaft	4	------	7	66.66	51	12,443	105,007	244	2,059
Surface	------	------	------	----------	2	390	3,900	195	1,950
Total	4	------	7	64.28	53	12,833	108,907	242	2,055
Grand total	116	2	175	26.72	3,349	818,427	6,624,630	244	1,978
BY STATES									
California	5	------	22	145.33	82	18,922	151,381	231	1,846
Illinois	11	------	4	9.25	223	52,862	432,597	237	1,940
Kansas	6	------	10	38.43	111	29,778	260,227	268	2,344
Kentucky	15	------	32	46.99	369	78,635	680,952	213	1,845
Missouri	26	1	36	38.22	448	120,267	968,042	268	2,161
Ohio	5	------	7	9.19	320	94,982	761,866	297	2,381
Pennsylvania	14	1	6	4.10	952	213,617	1,707,703	224	1,794
Tennessee	9	------	6	30.40	92	23,702	197,382	258	2,145
Virginia	3	------	7	24.29	148	39,609	288,179	268	1,947
West Virginia	6	------	7	15.24	244	57,374	459,254	235	1,882
Other States [3]	16	------	38	53.00	360	88,679	717,047	246	1,992
Total	116	2	175	26.72	3,349	818,427	6,624,630	244	1,978

[1] Includes limestone and other stone used in the manufacture of cement.
[2] Includes quarries that produce limestone used chiefly for making lime.
[3] Includes Alabama, Arkansas, Colorado, Georgia, Indiana, Iowa, Maine, Maryland, Michigan, Nevada, Oklahoma, Vermont, Washington, and Wyoming.

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HISTORICAL INJURY EXPERIENCE IN THE QUARRYING INDUSTRY

Beginning in 1911, the Bureau of Mines, with the cooperation of the quarrying industry, has collected annual reports of fatal and nonfatal injuries from operating companies of quarries, rock-dressing plants, crushers, cement mills, and limekilns at or near quarries in the United States.

Reports from the operating companies for 1911 and several years immediately thereafter, although comparatively complete in coverage of fatalities, did not appear complete for nonfatal injuries; therefore, the total number of injuries, as compiled from the reports, probably did not cover all injuries that actually occurred. This is shown by the rapid increase in the number of injuries reported for several years following 1911, which was too large to be explained solely by an increase in the injury-frequency rates based upon the number of men employed. It is believed that by 1916 the reports from the operating companies indicated the actual number of injuries with reasonable accuracy, since 173 fatal and 13,427 nonfatal injuries at quarries and related plants were reported, with 214.7 man-hours of employment or exposure to occupational risk and a combined (fatal and nonfatal) injury-frequency rate of 63.35 per million man-hours of employment. From 1916 to 1930 the nonfatal-injury-frequency rates showed a downward trend, with little change from 1930 to 1937. From 1937 the nonfatal rate declined until it reached its lowest point in 1940 when the rate was 35.23. The rate rose in 1941 to 39.67. The trend in the yearly fatality rates also was downward from 1916 until 1933. Since then, although the rates fluctuated, they have not again risen to the level of 1933, with the year 1954 showing a favorable decline in the number of fatal and nonfatal injuries.

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TABLE 30.—*Employment and injury data on the quarrying and related industries of the United States, 1911–54*

Year	Men at work	Average days active	Man-days worked	Average length of shift	Man-hours worked [1]	Number of injuries		Frequency rate per million man-hours	
						Fatal	Nonfatal	Fatal	Nonfatal [2]
1911	110, 954	228	25, 325, 094	.....	237, 043, 000	188	5, 390	0. 79	22. 74
1912	113, 105	249	28, 151, 042	.....	263, 494, 000	213	6, 552	. 81	24. 87
1913	106, 278	246	26, 142, 237	.....	244, 691, 000	183	7, 739	. 75	31. 63
1914	87, 936	233	20, 456, 157	.....	191, 470, 000	180	7, 836	. 94	40. 93
1915	100, 740	246	24, 734, 224	.....	231, 512, 000	148	9, 671	. 64	41. 77
1916	90, 797	253	22, 937, 178	.....	214, 692, 000	178	13, 427	. 81	62. 54
1917	82, 290	261	21, 457, 357	.....	200, 841, 000	131	13, 242	. 65	65. 93
1918	68, 332	260	17, 785, 504	.....	166, 472, 000	125	8, 719	. 75	52. 38
1919	75, 505	253	19, 13ɔ, 308	.....	179, 135, 000	123	9, 199	. 69	51. 35
1920	86, 48ɔ	26ɾ	23, 126, 648	.....	216, 465, 000	178	11, 217	. 82	51. 82
1921	77, 185	233	17, 987, 547	.....	168, 363, 000	120	10, 465	. 71	62. 16
1922	79, 081	261	20, 658, 338	.....	193, 362, 000	132	11, 839	. 68	61. 23
1923	92, 455	276	25, 545, 859	.....	239, 109, 000	143	14, 990	. 60	62. 69
1924	94, 242	269	25, 327, 858	9. 36	236, 982, 774	138	14, 777	. 58	62. 35
1925	91, 872	278	25, 045, 955	9. 31	233, 222, 241	149	14, 165	. 64	60. 74
1926	91, 146	271	24, 708, 400	9. 33	230, 464, 089	154	13, 201	. 67	57. 28
1927	91, 517	271	24, 782, 561	9. 27	229, 805, 889	135	13, 459	. 59	58. 57
1928	89, 667	272	24, 397, 377	9. 22	224, 953, 034	119	10, 568	. 53	46. 98
1929	85, 561	268	22, 967, 579	9. 22	211, 765, 529	126	9, 810	. 59	46. 32
1930	80, 633	255	20, 559, 372	9. 07	186, 502, 184	105	7, 417	. 56	39. 77
1931	69, 200	224	15, 526, ɔ03	8. 61	133, 750, 124	61	5, 427	. 46	40. 58
1932	56, 866	195	11, 114, 135	8. 43	93, 709, 860	32	3, 574	. 34	38. 14
1933	61, 927	183	11, 362, 151	7. 74	87, 888, 263	59	3, 637	. 67	41. 38
1934	64, 331	204	13, 108, 274	7. 27	95, 258, 880	60	3, 924	. 63	41. 19
1935	73, 005	200	14, 623, 303	7. 52	110, 033, 341	51	4, 152	. 46	37. 73
1936	80, 022	236	18, 874, 254	7. 79	147, 064, 448	91	5, 717	. 62	38. 87
1937	84, 094	241	20, 264, 125	7. 81	158, 298, 580	77	6, 348	. 49	40. 10
1938	77, 497	223	17, 255, 828	7. 75	133, 766, 111	82	5, 027	. 61	37. 58
1939	79, 449	236	18, 726, 080	7. 68	143, 846, 583	48	5, 204	. 33	36. 18
1940	79, 509	240	19, 121, 053	7. 70	147, 243, 591	72	5, 188	. 49	35. 23
1941	86, 123	260	22, 369, 886	7. 74	173, 165, 422	76	6, 870	. 44	39. 67
1942	84, 270	271	22, 807, 586	7. 93	180, 835, 533	112	6, 349	. 62	35. 11
1943	69, 877	274	19, 135, 528	8. 11	155, 280, 258	80	5, 199	. 52	33. 48
1944	58, 476	268	15, 690, 659	8. 24	129, 301, 925	73	4, 437	. 56	34. 32
1945	58, 180	264	15, 376, 227	8. 27	127, 168, 325	53	4, 121	. 42	32. 41
1946	70, 265	274	19, 261, 847	8. 23	158, 528, 175	55	5, 137	. 35	32. 40
1947	75, 245	279	20, 996, 415	8. 19	171, 978, 817	75	5, 504	. 44	32. 00
1948	77, 344	284	21, 993, 317	8. 14	179, 110, 509	75	4, 994	. 42	27. 88
1949	82, 209	275	22, 569, 321	8. 08	182, 258, 333	66	4, 826	. 36	26. 48
1950	85, 730	272	23, 346, 483	8. 12	189, 534, 811	54	4, 762	. 28	25. 12
1951	84, 802	277	23, 469, 692	8. 14	191, 113, 194	57	4, 945	. 30	25. 87
1952	81, 879	279	22, 843, 676	8. 17	186, 551, 830	74	4, 503	. 40	24. 14
1953	83, 641	278	23, 248, 371	8. 16	189, 776, 589	43	4, 450	. 23	23. 45
1954	78, 910	273	21, 505, 759	8. 18	175, 817, 150	34	3, 834	. 19	21. 81

[1] Man-hours for 1911–23 computed on assumption that weighted average length of workday was 9.36 hours, as shown by reports from representative operating companies for 1924.

[2] Injury rates for years before 1916 are believed not to be representative owing to probable incompleteness of reports of slight or minor injuries.

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